

ARKIV FÖR ZOOLOGI.

BAND 12. N:o 15.

Results

of

Dr. E. MJÖBERG'S

Swedish Scientific Expeditions

to

Australia 1910—1913.

19.

Isoptera

by

ERIC MJÖBERG.

With 6 Plates and 64 Figures in the Text.

Communicated April 23th 1919 by CHR. AURIVILLIUS and Y. SJÖSTEDT.

The following material was collected by the author during his two expeditions on the Australian continent. It comes chiefly from the dry desert-like country in the Kimberleydistrict of Northwest Australia and from the rain-dripping jungles or rain-forests in Queensland. Smaller collections were also made during my travels from west to east during my more temporary visits to Southwest Australia, New South Wales and the southern parts of Queensland.

The material comprises not less than 230 bottles and tubes, and is undoubtedly the largest and most comprehensive material ever collected from the Australian continent. It contains no less than 51 different species belonging to 12 different genera. Of these about 85 % or 36 species are new, thus bringing the number of known species from 44 up to 80. Only one genus has proved to be new. In addition,

there are quite a number of nests, mostly belonging to the hitherto undescribed species.

The most important discoveries are, in my mind, two new and interesting, very distinct, species of the genus *Stolotermes*, hitherto known in one species from Tasmania and another from New Zealand. Six new *Calotermes* species have been added to those previously known, all coming from the rain forests. Interesting also is the discovery of an Australian representative of the newly established genus *Parrhinotermes* HOLMGR. hitherto represented by three species in the Indian region. There are no less than 11 new *Eutermes* species, 8 new *Hamitermes* species, and finally 6 new *Mirotermes* species. Also the genus *Microcerotermes* has been increased by two new forms.

The material has enabled me to make some elder hitherto incompletely described species more completely known by describing unknown stages, etc. A special study was made of the nests in the Cape York Peninsula, which resulted in the discovery of the the peculiar habit of burying the dead on special grave-fields. A new explanation of the peculiar external appearance of the so called »magnetic nests» is also offered. In the last chapter a general view of the Australian termite fauna is given, with a complete list of the hitherto known species, their different stages, nests and geographical distribution.

Our present knowledge of the Australian termites is chiefly due to Mr. W. FROGGATT's work »Australian Termitidæ», Part I—III, 1895—1897 (Proc. Linn. soc.). It represents the first serious attempt to give a summarized view of the Australian numbers of the orders *Isoptera*. Before that time only some old species had been described by BRAUER, HAGEN and WALKER. No less than 25 new species were made known by FROGGATT. It is very regrettable, however, that many of his new species are too shortly or too generally described and the illustrations not accurate enough to allow of a sure identification. We must, however, give FROGGATT due credit for the pioneer-work, carried out by him within this group of insects at that time very little known.

The two latest workers on Australian termites are SILWESTRI and HOLMGREN. In his work »*Isoptera*, Die Fauna Südwest-Australiens», Bd II, Lieferung 17, 1909, SILWESTRI

adds no less than 9 new species and one new endemic genus (*Monodontermes*). He also created several new genera for certain already described species, which, however, have either been reduced or accepted as sub-genera by HOLMGREN. The almost entire absence of any field observations or information about the life, habits and nests of SILWESTRI's new species is very much to be regretted. The termite fauna of the very old, and from a botanical point of view specially interesting, southwest corner of Australia is apparently very rich and would repay more careful study, both from a systematic and from a biological standpoint.

HOLMGREN's big work »Termiten-Studien» (1—4, 1909, 1911, 1912, Kungl. Vetenskapsakademiens Handlingar) in many way marks a new era in our study of the termites. It is a very modern work and adds considerably to our knowledge of the anatomy as well as of the classification of the group. He endeavours to introduce quite a new system based on new investigations. The old, more or less artificial system, is replaced by a phylogenetic one, where the families, the genera and species are grouped together according to their natural relationship. Even if HOLMGREN's new system is bound to be subjected to certain modifications in the future, it marks a decided advance and constitutes in its mainlines a sound basis for future workers to build upon. For these reasons I have adopted his system in the following.

HOLMGREN adds two new Australian species of the genus *Porotermes*, thus bringing the number of known distinct species up to 44.

Order Isoptera.

I. Family Mastotermitidæ HOLMGR.

1. *Mastotermes darwiniensis* FROGG.

This very archaic form seems to be widely and copiously spread all over the sub-tropical belt of Australia. It is common in the Kimberly district, where it can be found under logs and stones and in dead tree-trunks. It causes great damage by attacking dry timber, planks, poles etc. The »nest» is not yet known. I have found its very simple galleries and ducts, forming hole by hole covered up by a clay substance in the soft wood of the »cork-tree» (*Gyrcarpus Jaquini*) in the vicinity of Broome ($^{10}/_6$). I have also found its simple galleries under *Eucalyptus* bark (Broome $^{8}/_{10}$) extending deeply into the sound wood. Soldiers and workers can be found at any time of the year. I have specimens from Derby (»on the root of tomato-plants»), Broome (»under the bark of a fallen tree, building galleries of clay», »under a stone on the ground», »making galleries of clay on walls»), Laura (North Queensland), in the nests of *Eutermes magnus*, also on the ground in dead logs.

The winged insects appear at the beginning of the wet season (Dec., Jan.) and can easily be collected at night-time with a light. — Noonkanbah ($^{6}/_3$), Spring station, Oscar Range ($^{21}/_1$).

II. Family Protermitidæ HOLMGR.

Genus *Stolotermes* HAGEN.

This well defined genus was hitherto represented by only two species, *St. brunneicornis* HAG. from Tasmania and *St. ruficeps* BR. from New Zealand. Of the former only the imago, of the latter the imago (wingless) and the soldier were known. The genus differs in so many important characters

from the other genera of the *Protermitidæ*, that HOLMGREN (1910) seems to be well justified in creating a new sub-family *Stolotermitidæ*. The discovery of two quite new species from the rain-forests or jungles of Queensland is of greatest interest, showing that the genus in earlier days apparently had a more northern distribution, and perhaps is to be regarded as a true Australian element with single offshoots to the two big southern islands. Further investigations will doubtless bring to light additional species in Queensland, and perhaps also in New Guinea.

The two new species both differ from the two old species by their flattened heads and a larger number of joints in the antennæ.

Key

to the two known imagines of the genus *Stolotermes*.

- | | |
|-------------------------|---|
| I. Antennæ 17-jointed. | 1. <i>St. queenslandicus</i> MJÖB. n. sp. |
| II. Antennæ 16-jointed. | 2. <i>St. brunneicornis</i> HAG. |
- Distribution:* Tasmania.

Key

to the soldiers of the *Stolotermes*-species.

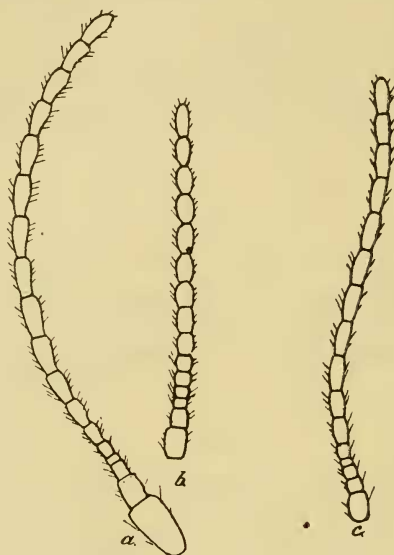
- | | |
|---|--|
| I. Antennæ 18-jointed.
(Text Fig. 1 a.) | 1. <i>St. queenslandicus</i> MJÖB.
<i>Distribution:</i> Queensland. |
| II. Antennæ 16-jointed.
(Text Fig. 1 c.) | 2. <i>St. australicus</i> MJÖB. n. sp.
<i>Distribution:</i> Queensland. |
| III. Antennæ 15-jointed. | 3. <i>St. ruficeps</i> BR.
<i>Distribution:</i> New Zealand. |

The hitherto unknown worker will be described in the following.¹

¹ The genus *Porotermes* (HAG.) has a very peculiar distribution. One of the five known species (*P. quadricollis* RAUB) lives in Chili, one (*P. planiceps* SJÖST.) in South Africa, one (*P. Adamsoni* FROGG.) in New South Wales, a fourth (*P. Frogatti* HOLMGR.) in Tasmania, and a fifth (*P. grandis* HOLMGR.) in Victoria. They represent apparently the last surviving remnants of an old group, the centre of development of which is still unknown. Only the discovery of further primitive forms can throw light upon the true home of the *Porotermes*-termites. It must always be borne in mind that the present distribution of genera and species cannot be used as a basis of inference for the centre of development of a group.

2. *Stolotermes queenslandicus* n. sp.

Imago (Plate 1, Fig. 2, Text Fig. 1, 2.) General colour dark reddish-brown, under-surface much lighter; jaws (except the tips) posterior parts of the head, a more or less T-shaped marking on the prothorax (from the anterior margin through the centre in the form of a narrow yellow line), lateral markings of meso- and metathorax, and a median line through the

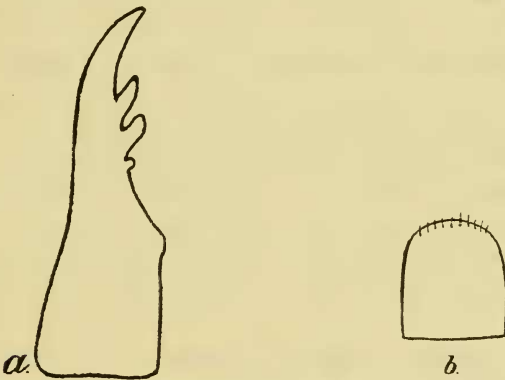


Text Fig. 1. *a* Antenna of soldier of *Stolotermes queenslandicus* MjÖB. n. sp.
b » » worker » » » » »
c » » soldier » » *australicus* » »

centre of the abdomen, yellowish-white. Wings smoky-fuscous, when folded together very nearly black.

Head much flattened, rounded slightly convex on the summit; eyes large and prominent, coarsely faceted, black sutures distinctly visible in shape of lighter narrow lines, springing from the inner margin of the eyes, meeting further back on the hind head and continuing to the posterior margin. Joints of palpi and antennæ fuscous, lighter at the base and top. Clypeus distinctly marked with a basal and an apical part; labrum broad, large, rounded and hairy at the tip. Jaws broad and short, with two sharp well-marked apical teeth and a smaller blunt one further down, the basal

inner part finely serrated. Antennæ distinctly 17-jointed, long and slender, hairy, 1st or basal joint stout and large, broadening towards apex, 2nd shorter and more cylindrical, 3rd very short, three times as wide as long, 4th and 5th slightly longer and broader, 6th still broader and more rounded, 7th to 16th gradually longer and slender, the apical joint elongate, cylindrical, rounded at the tip. Prothorax more than twice as broad as long, heart-shaped, slightly arcuate at the anterior margin, almost truncate at the hind margin, with long hairs at the sides; meso- and metathorax much broader, with a dark median line. Abdomen long, broadest in the middle,



Text Fig. 2. *a* Left jaw of soldier of *Stolotermes queenlandicus* Mjöv. n. sp.
b Labrum » soldier » » » »

rounded at the apex, cerci well developed, undistinctly 4-jointed, styli (♂) seemingly 1-jointed. Wings long and broad, rounded at the apex, hindwings broader but shorter than the forewings. Costal and subcostal nervures more or less rudimentary; radius unbranched, running from the base towards the anterior margin through the basal fourth part of the wing; radius well developed, sending out about 9 transverse, more or less parallel, nervures to the anterior margin, mediana running through the centre of the wings, sending off about 6—8 oblique simple or branched nervures; cubitus distinctly developed, with 5—7 oblique nervures. Hindwings with very similar nervature. The margin of the wing all round with scattered hairs; between radius sector and mediana several fine communicating nervures forming a light network on the membrane.

Measurements: Length of body with wings 15 mm, length of body without wings 7,5 mm; length of head 1,52 mm, breadth of head¹ 1,57 mm, length of prothorax 0,6 mm, breadth of prothorax 1 mm, length of forewings 13 mm, breadth of forewings 3,46 mm, length of hindwings 12 mm, breadth of hindwings 4 mm, breadth of abdomen 2,1 mm.

Soldier (Plate 1, Fig. 6, Text Fig. 1 a, 2). Body depressed, yellowish-white, tips of jaws and eyes black, head rufous. Head much longer than broad, broadest at the eyes, tapering slightly towards the base, rounded at the sides, posterior angles rounded, sutures very distinct, rugous in front; eyes not prominent, broader than long. Labrum (Text Fig. 2 b) large, convex, covering base of jaws, with a row of hairs at the tip. Antennæ (Text Fig. 1 a) springing from a cleft in front of the head, 18-jointed, the first two joints stout and long, the 3rd much shorter and smaller, the 4th the shortest, the 5th and following gradually longer and more slender, lighter coloured at the bases and the tips, hairy. Jaws long and sharp, the left with two large flat and leaf-like teeth and a smaller rounded one immediately below the second, the right with a large flat tooth above the middle and a broad, blunt one further down; prothorax broad, heart-shaped, slightly arcuate in the middle at the anterior margin, hairy at the sides, sloping sharply towards the apical margin, in the middle of the disc near the anterior margin with two distinct rounded impressions and a median line; meso- and metathorax much broader, with a lateral impression at each side. Legs comparatively short, femora very thick, tibiæ more slender. Adomen flat, shining, broadest in the middle, the last segment arcuate at the tip.

Measurements: Length of body² 12 mm, length of head with jaws 5 mm, length of head without jaws 3,2 mm, breadth of head 2,13 mm, length of prothorax 0,77 mm, breadth of prothorax 1,31 mm, breadth of abdomen 1,93 mm.

Worker (Text Fig. 1 b). Yellowish-white, only the eyes and a chitinous spot near the root of the antennæ dark-brown, head light rufous. Head rounded, very nearly circular,

¹ Reckoning from external margin of the eyes.

² From tip of abdomen to tips of jaws.

shining deeply impressed between the eyes; labrum large, convex, completely covering the jaws, narrow at base, broader and rounded at the tip, hairy; jaws short, irregularly triangular, yellowish-white, except the interior half, which is fuscous, at the extreme tip with two well-marked sharp teeth and a third more rectangular one immediately below, the basal inner portion finely serrated as in the imago. Antennæ shorter (14-) 15-jointed, the basal joints showing a tendency to divide themselves by indistinct sutures, the last joints well set-off, rounded at the sides, a little longer than broad, hairy, the first and second joint slightly incrassated, the third sometimes indistinctly divided into two, the fourth a little longer; prothorax not so broad as the head, slightly arcuate and broader in front, the sides sharply sloping towards the rounded apical margin, with two deep impressions in front near the margin and a median impressed line, meso- and metathorax slightly broader; abdomen long and slender; cerci and styli as in the imago.

Measurements: Length of body 6,3 mm, length of head 1,33 mm, breadth of head 1,15 mm, length of prothorax 0,39 mm, breadth of prothorax 0,66 mm, breadth of abdomen 1,29 mm.

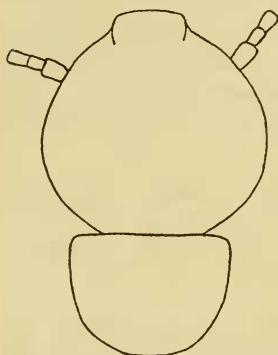
This very characteristic species lives in small communities in the dead, rotten logs of the so called »bullock» (a member of the family Meliacæ?) where it forms irregular galleries; it is a typical inhabitant of the rain-forests or jungles. I have specimens from Cedar Creek (April), Malanda (Febr., June) and Herberton (January). The winged insects appear at the end of the wet season (April).

3. *Stolotermes australicus* n. sp.

Soldier (Plate 1, Fig. 8, Text Fig. 1 c, 3). Yellowish-white, depressed, slender, head with jaws rufous.

Head flat, much longer than broad, broadest near the eyes, tapering slightly to the base, anterior angles before the eyes projecting in the shape of an obtuse angle, posterior angles rounded; clypeus broad, rounded at the tip, labrum large, convex, broadest at the base tapering towards the apex, covering the basal third part of the jaws, hairy; jaws

very long and sharp, the left with three teeth, one very large, flat and leaf-like a little below the tip, another sharper one immediately below and a smaller blunt one further down; the right one with two smaller and not so prominent teeth on the upper half part of the jaw; antennæ springing from a deep and strongly chitinized cleft, distinctly 16-jointed, basal joint stout and robust. 2nd much smaller and not so broad, 3rd a little more than half so long, broader towards the apex, 4th the shortest one, 5th as long as the 3rd, 6th to 16th gradually longer and slender, the tip-joint rounded at the apex, tips and base of all joints lighter in colour; eyes in the shape of a transverse black spot on each side of the head a little



Text Fig. 3. Shape of head and prothorax of worker of *Stolutermes australicus* MjÖB. n. sp.

behind the root of the antenna; prothorax much more narrow than the head, the front margin obtuse, slightly arcuate in the centre, anterior angles rounded, sides sharply tapering to the apical margin, provided with some stiff hairs; meso- and metathorax much broader; legs comparatively short, femora incrassated, tibiæ slender. Abdomen parallel, slender, cerci and styli small.

Measurements: Length of body 7,2 mm, length of head with jaws 4 mm, length of head without jaws 2,8 mm, breadth of head 1,52 mm, length of prothorax 0,52 mm, breadth of prothorax 0,91 mm, breadth of abdomen 1,27 mm.

Worker. Yellowish white, only the eyes and a chitinous spot in front of the antennæ dark-brown. —

Head circular round, labrum large convex, rounded at the tip, completely covering the jaws, which in shape and colour quite agree with those of the worker of *Stolut. queenslandicus* MjÖB.; antennæ indistinctly 13-jointed, first joint stout, 2nd, 3rd and 4th indistinctly separated by sutures. 5th to 13th rounded, short, gradually growing longer and longer, apical joint slender with parallel sides and rounded top; prothorax much broader than long, slightly arcuate at the front margin, anterior angles broadly rounded, sides tapering to the completely rounded hind angles, sides as

well as surface richly hairy; femora incrassated, abdomen long, slender, thickly hairy, cerci and styli small.

Measurements: Length of body 6,4 mm, length of head 1,18 mm, breadth of head 1,08 mm, length of prothorax 0,46 mm, breadth of prothorax 0,76 mm, breadth 1,29 mm.

I have collected quite a number of soldiers and workers in rotten logs, where it builds irregular galleries, at Cedar Creek, April 1913. Like the former species, it is a typical inhabitant of the jungles.

Genus *Calotermes* Hg.

About 70 different species of the *Calotermes* genus are hitherto known from the most different parts of the world. Up till now 8 different species were known from the Australian Continent and 1 from New Zealand; some of the species, however, are too badly and too generally described to allow of a certain identification.

My new material contains not less than 6 new species, the soldiers of which may be tabulated as follows.

Key

to the soldiers of the six new described Calotermes species in the following.

- I. Body stout, with large head, with more than 15 joints in the antennæ.
 - A. Without eyes.
 1. Head very large, rounded at the sides, left jaw with three teeth. 1. *C. malandensis* MJÖB. n. sp. (Plate 1, fig. 4.)
 2. Head large, with more parallel sides, left jaw with four more or less rounded teeth. (Plate 1, fig. 5.) 2. *C. paralleiceps* MJÖB. n. sp.
 - B. With small, black eyes. 3. *C. oculifer* MJÖB. n. sp. (Plate 1, fig. 3.)
- II. Body much more slender, antennæ not more than 14-jointed.

A. Antennæ 14-jointed. 4. *C. dubius* MJÖB. n. sp.

B. Antennæ 13-jointed.

(Text Fig. 10.)

1. Left jaw with only three teeth.

(Plate 1, Fig. 7, Text Fig. 9 a.) 5. *C. affinis* MJÖB. n. sp.

2. Left jaw with more than three teeth.

(Text Fig. 11 b.) 6. *C. trilineatus* MJÖB. n. sp.

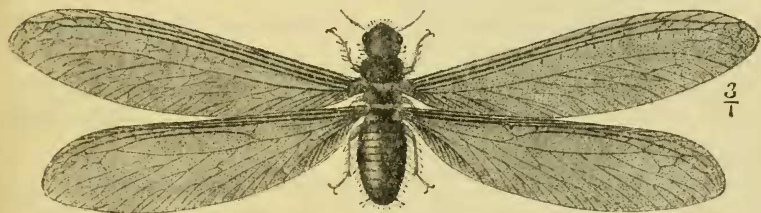
All the six species seem to be limited in their distribution to the rain-forests; five of them occur only in Northern Queensland, only one (*C. affinis* MJÖB. n. sp.) in the southern parts. They all build galleries and ducts in old rotten logs or in branches on the ground.

4. *Calotermes malandensis* n. sp.

Imago (Text Fig. 4). Stout and robust, ferruginous, underside yellowish, eyes and tips of jaws black, wings very long, membrane as well as nervures ferruginous.

Head slightly longer than broad, rounded, a little flattened on the summit, transversally depressed in front before the eyes; clypeus broad, rounded at the sides, dull white; labrum slightly broader than long, convex, with a longitudinal impression at each side near the base; jaws with the basal part yellow, the apical part black, slightly asymmetrical, with three apical teeth; eyes large and prominent, coarsely faceted, ocelli in the shape of a rounded yellow spot near the inner margin of each eye. Antennæ 20-jointed (21?), basal joint very broad and stout, 2nd shorter, very nearly of the same length as the 3rd, but broader at the tip, 4th and 5th short, rounded, 6th and following more elongate, all fringed with long hairs, the bases and tips uncoloured; prothorax much broader than long, broader than the head, slightly emarginate at the anterior margin, rounded at the sides, with a faint median line; sides showing an impressed line following the border and continuing round the anterior angles to a distance about a third part of the anterior margin and there turning backwards, near the posterior margin two small transverse impressions; meso- and metathorax more lightly coloured, with a distinct dark, median suture. Wings very long and darkly coloured, thickly reticulated with

fine veinlets, forewings four times as long as broad, hind wings a little shorter; scapular shield on the forewing much larger, showing the base of six strongly marked nervures, rounded, the anal field well set off, the nervature very variable (see Text Fig. 4), the first nervure (costa) hardly visible from above, not very far from the wing-root meeting and joining with the second one (subcosta), which runs along the border of the wing to near the middle, where it joints with the strong 3rd one (radius) and continues along the margin; the 4th (radius sector) freely emerging from the scapular shield and running parallel with the margin almost right out to the tip, sending out 9 parrallel transverse nervures forwards; the 5th nervure (mediana) runs close to the 4th, connected with it at irregular intervals by about 14 transverse nervures and sending out backwards a varying number



Text Fig. 4. Imago of *Calotermes malandensis* MJÖB. n. sp.

of darkly coloured nervlets into the membrane, which further on becomes more transparent and forms a faint irregular network in the interstice between the 5th and the 6th (cubitus) nervures; cubitus very well developed, running through the middle of the wing and sending out about 6 short, thick, darkly coloured transverse nervures at base of which the 2nd, the 4th and the 6th often are forked near the base, and further out on the membrane 5—6 more faint, irregular nervures, which sometimes are connected by smaller cross nervures; the hind wing has a very small scapular shield, wherein hardly any nervures can be traced; only four strong nervures commence at the base; the costa is quite rudimentary, the subcosta follows the anterior board of the wing, the radius at first runs nearly parallel to it, but further out slopes up into the subcosta, and near the middle is connected with it by a small cross-veinlet; radius sector (3rd)

well developed, running parallel with the anterior margin, very nearly reaching the tip of the wing and sending out about 6 oblique nervures forwards; mediana (4th) branches off from the basal portion of radius sector, runs out to the tip and is connected with it by 8—10 cross-veinlets; cubitus (5th) chiefly as in the forewing, the reticulation between mediana and cubitus a little fainter. Legs rather short and robust, thighs comparatively short and thick, tibiae short, slightly bent, with 3 strong sharp spines at the apex, the interior one longest and sharpest, all very finely serrated, the plantula small; abdomen fairly broad, slightly flattened on the dorsal side, rounded at the apex; cerci and styli small and short.

Measurements: Length of body with wings 25,5 mm, length of body without wings 11 mm, length of head 3 mm, breadth of body 2,6 mm, length of prothorax 1,5 mm, breadth of prothorax 2,8 mm, length of forewings 21 mm, breadth of forewings 5,6 mm, length of hindwings 19,5 mm, breadth of hindwings 6,5 mm, breadth of abdomen 3,5 mm.

Soldier (Plate 1, Fig. 4). Strongly built, yellowish white, head rufous, jaws black.

Head very large, cylindrical, anterior angles more obtuse, posterior rounded, slightly flattened on the summit, sloping down behind clypeus and there rugous with a median, not very deep furrow, shining; clypeus broad, depressed in the middle, not distinctly marked off from the forehead, with irregular, rugous sculpture, labrum small, rounded, broadest at the base, projecting to the posterior tooth of the right jaw, antennæ 19-jointed, very hairy, springing from a round cleft, basal joint short and stout, 2nd shorter and not so broad, 3rd distinctly longer than the surrounding joints, 4th short, broader than long, 5th—12th more rounded, 13th—19th gradually growing longer and slender; jaws very stout and strong, black, curving inwards and crossing over each other not far from the tips, the left one with two teeth of about equal size and shape a little below the tip and a rounded one further down, which sometimes gives the impression of a double tooth, the right one with a very large projecting tooth near the middle of the jaw and a more obtuse one further down; prothorax not so broad as the head, more than twice as broad as long, rounded at the sides and at

the angles with three fairly deep impressions, one in the middle and two small ones at the sides a little behind the anterior margin, and two small transverse impressions in the middle near the posterior margin; meso- and metathorax not so broad, with a transversal impression on each side near the lateral margin; legs short and robust, femora incrassated, tibiæ short, with three darkly coloured apical spines, claws dark-brown; abdomen rather broad and rounded with a median transparent line and a spot on each side near the sides; cerci and styli very short.

Measurements: Length of body (with jaws) 13 mm, length of head with jaws 7 mm, length of head without jaws 4,6 mm, breadth of head 3,5 mm, length of prothorax 1,6 mm, breadth of prothorax 3,1 mm, breadth of abdomen 4,9 mm.

Worker. Body broad and stout as in the soldier, dull white, head a little more yellowish, tips of jaws and a transversal frontal band on the basal part of clypeus dark-black, the apical part of clypeus distinctly set off, hyaline, labrum rounded convex, semi-transparent; antennæ of similar shape and form as in the soldier, at least 17-



Text Fig. 5. Galleries in a jungle tree of *Caloterme malandensis* MJÖB. n. sp.
At the base a cross-section shows the galleries. .

jointed, head rounded, vertical, jaws broad triangular, with two distinct teeth at the tip and a very obtuse undistinct one immediately below the second one, slightly asymmetrical; prothorax much broader than long, anterior margin slightly

arcuate, with long stiff hairs at the sides and two yellowish spots near the front margin; in other respects very similar to the soldier.

Measurements: Length of body 11,5 mm, length of head 2,8 mm, breadth of head 2,7 mm, length of prothorax 1,6 mm, breadth of prothorax 2,8 mm, breadth of abdomen 3,5 mm.

This very large and characteristic species seems to be related to the species *C. insularis* WHITE, *C. irregularis* FROGG. and *C. robustus* FROGG. among the Australian, and to *C. schulzei* HOLMGR. and *C. papua* DESN. among the Papuan species. The winged form is even larger than the imago of *C. insularis* WHITE, from which it differs by the darkly



Text Fig. 6.
Shape of egg
of *Caloter-
mes malan-
densis* MjöB.
n. sp.

coloured wings, and the different nervature. From *C. irregularis* FROGG. it differs by its size, the colour and nervature of the wings, the differently shaped jaws; from *C. robustus* FROGG., it is well separated by the size of the imago, the nervature, the form of the antennæ, the tibiæ, having only three apical spines, etc. It is well separated also from the New Guinean species by its considerably larger size, the breadth of prothorax, the number of joints of antennæ, etc. — It is a typical inhabitant of the rain-forests and seems to be limited in its distribution to the Atherton-Herberton tableland and the Mulgrave valley. It leaves in dead trees or logs on the ground, where it forms irregular ducts and galleries, which it closes by means of a clayey substance (Text Fig. 5). I have found fresh eggs (length 1,62 mm, breadth 0,51 mm) together with some imagines and workers in small branches on the ground (April). No signs of any queens could be seen. The eggs are unusually long and slightly curved (Text Fig. 6). Specimens have been collected at Cedar Creek (April, also winged ones), Malanda (March, also winged ones) and Bellenden Ker (May).

5. *Calotermes* (*Neotermes*) *parallelicept* n. sp.

Imago (wingless). Body broad, slightly depressed, ferruginous, shining, underside lighter, eyes and tips of jaws black.

Head a little longer than broad, depressed on the summit and in front, with an indistinct, median line, slightly rounded at the sides, anterior and posterior angles rounded; clypeus broad, yellowish white, impressed at each side, obtuse at the anterior margin; labrum very characteristic, narrow at the base, broader in the middle, broadly rounded at the anterior angles, strongly convex, with a row of apical stiff hairs; jaws black at the tip, lighter coloured at the base, with a larger not very sharp apical tooth and two more obtuse ones further down; eyes very large, coarsely faceted, very prominent; antennæ ?-jointed, basal joint broad and stout, 2nd smaller and shorter, 3rd darker coloured (strongly chitinized) than the rest, 4th small, 5th and following very rounded, with long hairs; prothorax very broad and short, more than twice as broad as long, about as broad as the head; slightly emarginate at the anterior margin; all angles rounded, with a fine median line and two small impressions on each side before the middle; meso- and metathorax smaller, the former with a median black line on the anterior half part; the scapular shield large and broad, sending out into the wing membrane six strong free nervures, which converge within the shield towards the base and are united into three pairs; legs of normal type, femora thick, tibiæ short and slightly bent, with tree spines at the apex; abdomen flattened, rounded at the tip, richly hairy.

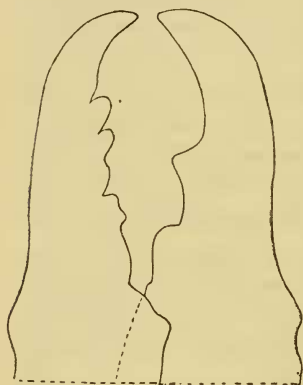
Measurements: Length of body 10,5 mm, length of head 2,6 mm, breadth of head 2,4 mm, length of prothorax 1,42 mm, breadth of prothorax 2,7 mm, breadth of abdomen 2,6 mm.

Soldier (Plate 1, Fig. 5, Text Fig. 7). Body slender, with parallel sides, head and base of jaws light rufous, tips of jaws black.

Head very long, with parallel sides, anterior angles obtuse, hind angles rounded, flattened on the summit and with a broad and deep furrow in the front, shining; clypeus broad, with a median impression and a row of stiff hairs, its apical part dull white, truncate in front, labrum of a very characteristic shape, broadest at the base, the anterior angles rounded, ending in a broad, more or less spade-like tip, the upper surface slightly convex towards the middle, where it is distinctly bent down; its sides are slightly turned up and

followed by a finely impressed line; jaws curved inwards and crossing over each other with the tips, the left with four obtuse teeth (the lowest one the largest and sometimes giving the impression of a double tooth), the right with one large triangular tooth in the middle and a large rounded one further down; antennæ ?-jointed, basal joint stout and robust, 2nd much smaller, 3rd much longer than the 2nd and more darkly coloured, 4th and following gradually longer, rounded at the sides, lighter coloured at base and tip; prothorax very broad and heart-shaped, with broadly flattened sides, slightly emarginate at the anterior margin, with three indistinct impressions in the middle near the

front margin, meso- and metathorax flattened down at the sides; legs of moderate size, claws darker; abdomen with more or less parallel sides, the segments with longer and shorter hairs in rows, tip rounded; cerci and styli small.



Text Fig. 7. Jaws of soldier of *Calotermes paralleliceps* Mjöv. n. sp.

Measurements: Length of body (with jaws) 13,5 mm, length of head with jaws 6 mm, length of head without jaws 4 mm, breadth of head 2,3 mm, length of prothorax 1,22 mm, breadth of prothorax 2,4 mm, breadth of abdomen 2,5 mm.

Worker. Dull white, tips of jaws and a (dark) spot in front on either side of clypeus brownish-black. — Head rounded at the sides and at the angles; clypeus with a broad narrow basal part, the apical part semi-transparent, narrow, its side distinctly converging towards the truncated anterior margin; labrum very narrow at the base, much broader at the tip, rounded, antennæ 14(?) -jointed, the 3rd joint much longer than the second, the 4th very short, the 5th and following very rounded, nearly circular; prothorax in shape and form as in the soldier, with two indistinct darker spots in the centre near the anterior margin; abdomen somewhat rounded.

Measurements: Length of body 9 mm, length of head 2,5 mm, breadth of head 1,9 mm, length of prothorax 0,86

mm, breadth of prothorax 1,84 mm, breadth of abdomen 3 mm.

This species has its nearest relatives in *C. longiceps* FROGG., *C. irregularis* FROGG. and *C. malandensis* MJÖB. From the first it is easily distinguished by the shape of the head, the dentition of the jaws and the dimensions, from the second by the shape of the head, the labrum, the jaws, etc. and also the size, from the third by the longer and the more parallel head, the jaws and many other characters.

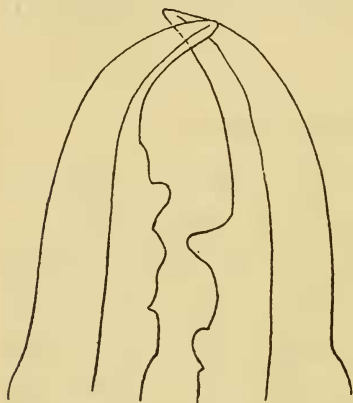
It is a typical inhabitant of the rain-forests or jungles. I have found numerous workers, two soldiers and two wingless imagines in a rotten log at Cedar Creek, N. Queensland (May).

6. *Calotermes* (*Neotermes*) *oculifer* n. sp.

Soldier (Plate 1, Fig. 3, Text Fig. 8). Body comparatively short and stout, dull white, head rufous, jaws black.

Head much longer than broad, with parallel sides slightly emarginate at the hind-margin, shining, anterior angles obtuse, posterior rounded, slightly impressed on the summit in the centre and with a fairly deep median furrow in the front, reaching backwards to the centre of the head; clypeus rectangular, short, its basal part not well marked; labrum short and small, broadest at the base, rounded towards the tip, its apical half bent down, and carrying a row of stiff hairs; jaws curved at the outside, ridged on the upper side, somewhat similar to those of *C. malandensis* MJÖB., but smaller and the teeth different, the left with one rounded tooth above the middle, another rounded smaller one below, and a more rectangular one further down, the third situated just a little in front of the tip of the labrum, the right with a very large, fairly sharp, triangular, inwardly directed tooth, and a more rounded one a bit further down, corresponding to and situated at the same height as the third tooth of the left jaw, tips crossing over each other near the ends; antennæ more than 15-jointed, basal joint broad and stout, 2nd shorter, 3rd much longer, deeply rufous and darker than the other joints, 4th only half as long as the 3rd, 5th and following gradually longer and slender; eyes

distinctly marked by a lateral black, rounded spot on each side, just behind the root of the antenna; prothorax of very characteristic shape, very much broader than the hind head, deeply and broadly emarginate in the centre of the anterior margin, rounded at the sides, with three small median impressions nearer the anterior margin and a dark crossline; meso- and metathorax deeply emarginate in the centre of the posterior margin, causing the posterior angles to protrude backwards; legs of moderate size, femora incrassated, tibiæ short, with three darkly coloured short and strong apical spines, exterior half of the claws darker; abdomen fairly short and broad, upper surface shining, with a transverse row of long erect hairs, the tip rounded, cerci and styli well-developed.



Text Fig. 8. Dentition of jaws in soldier of *Caloterмес oculifer* MjÖB. n. sp.

Measurements: Length of body short jaws 12 mm, length of head with jaws 5,6 mm, length of head without jaws 4 mm, breadth of head 2,5 mm, length of prothorax 1,33 mm, breadth of prothorax 3 mm, breadth of abdomen 2,2 mm.

Worker. Dull white, a spot on each side of the fore-head in front of the antennæ and tips of jaws darker.

Head rounded with the sutures distinctly visible, the frontal part whitish, clypeus in front of the same breadth as the small and rounded labrum, antennæ short, 13-jointed, 4th joint the shortest, the rest also short, except the apical joints, which are more slender; prothorax of the same breadth as the head, much broader than long, emarginate at the anterior margin, rounded at the sides and the posterior margin, posterior angles slightly obtuse, posterior angles of meso- and metathorax protruding, though not so much as in the soldier. Legs and abdomen as in the soldier.

Measurements: Length of body 8 mm, length of head 2,1 mm, breadth of head 1,82 mm, length of prothorax 0,95 mm, breadth of prothorax 2,28 mm, breadth of abdomen 2,5 mm.

This species seems to be related to *C. malandensis* MJÖB. but differs plainly by the considerably smaller size, the shape and form of the head, the dentition of the jaws, the very broad, emarginate prothorax, and the protruding hind angles of meso- and metathorax. It is also characterized by the well-developed dark rounded eyes.

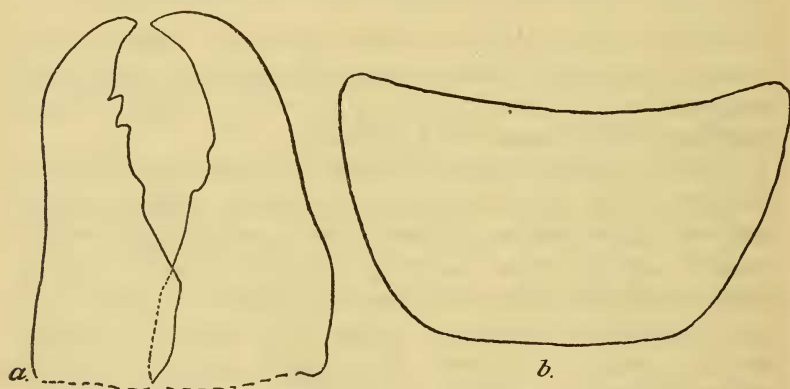
I have found two soldiers and a number of workers at Cedar creek, N. Queensland (April). It forms simple ducts and galleries in rotten logs. It is an inhabitant of the rain-forests or jungles.

7. *Calotermes* (*Glyptotermes*) *affinis* n. sp.

Imago (Plate 2, Fig. 7; Text Fig. 9 b). General colour fuscous, underside luteous, head slightly darker, eyes black, wings vitreous, slightly shining, nervures light yellowish, scapular shield clouded with yellowish.

Head vertical, rounded, broadest behind the eyes, tapering slightly to the back and front, posterior angles rounded, anterior rather obtuse, impressed in front, clypeus whitish, broadest at the base, tapering slightly towards the tip; labrum shell-like, narrow at the base, slightly truncate at the tip, completely covering the jaws; jaws broadly triangular, the left with a long and sharp tooth at the extreme tip and two shorter and more triangular ones immediately below, at the base a very small triangular tooth; antennæ short, 13-jointed, the 4th joint the shortest, 7th to 12th more rounded, the apical one elongate; eyes large and slightly prominent, coarsely faceted; ocelli oval, oblique, situated near the inner margin of the eyes; prothorax as broad as the head, broadly heart-shaped, slightly emarginate at the anterior margin, anterior angles broadly rounded, sides flattened and followed by an impressed line, which continues round the anterior angles and to about a third part of the anterior margin, where it suddenly turns backwards; meso- and metathorax with a distinct dark median line; wings not quite three times as long as broad, transparent, whitish when dry, the whole of the wings covered with fine dots forming irregular nervures here and there, the interstices behind the front margin and between the nervures and the anal field

more or less clouded by light fuscous; scapular field of the forewings long and broad, sending out five free nervures, cross-suture transverse, the first nervure (costa) running along the margin, broad and stout, out to the tip, the second (subcosta?) very short, running into the costa a little, but outside of the scapular shield; the third (radius) runs out free from the shield parallel with the board, but soon turns forwards and runs up into costa within the first basal third of the wing, the fourth (radius sector) and the fifth (mediana) run both free from each other parallel and unbranched right out to the tip; cubitus runs through the middle of the wing sending out a variable number of branches (8—10); in the hindwing the subcosta is quite rudi-



Text Fig. 9. a Jaws of soldier of *Calotermes affinis* MjöB. n. sp.
 b Prothorax » imago » » » » » »

mentary, radius runs as in the forewing up into the costa, radius sector and mediana commence as a single nervure at the base but split up further out within the basal third part of the wing into two stout parallel nervures, which run very closely to each other out to the tip, where they rejoin; legs fairly short and broad, tibiæ slender, with three finely serrated apical spines, the interior one the longest; abdomen fuscous, with parallel sides, apical segment rounded, truncated at tip.

Measurements: Length of body with wings 12 mm, length of body without wings 7,5 mm, length of head 1,43 mm, breadth of head 1 mm, length of prothorax 0,67 mm, breadth of prothorax 1,08 mm, length of forewings 9,5 mm,

breadth of forewings 2,5 mm, length of hindwings 8 mm, breadth of hindwings 2,4 mm, breadth of abdomen 1,3 mm.

Soldier (Plate 1, Fig. 7, Text Fig. 9 a and 10). General colour dull white, head rufous, jaws black, fuscous at the base.

Head not twice as long as broad from the base to the anterior margin of clypeus, cylindrical, with parallel sides, posterior angles rounded, anterior obtuse, sloping down rather sharply in the front, irregularly rugous; clypeus broad and short, abruptly truncate in front; labrum much smaller, reaching to the second tooth of the right jaw, narrow, rounded at the sides, slightly truncate at the tip; jaws curved, crossing over each other with the tips, the left with three small, obtuse, more or less triangular teeth above the middle, the right with two indistinct, more or less triangular, teeth and a small incision further down; antennæ (Text Fig. 4) reaching to the tip of the jaws, 13-jointed, basal joint very stout, darkly rufous, the rest much lighter, yellowish white, 5th to 12th very much broader at the tip; prothorax much broader than long, slightly emarginate at the anterior margin, anterior angles rounded, sides tapering towards the broadly rounded hind angles, slightly emarginate at the hind margin, with a faint median line, sides broadly flattened, marked off as described in the imago, meso- and metathorax a little broader, emarginate at the posterior margin, legs as in imago; abdomen with parallel sides, shining.



Text Fig. 10.
Antenna of
soldier of
Glyptotermes
affinis MJÖB.
n. sp.

Measurements: Length of body (with jaws) 7,5 mm, length of head with jaws 3,1 mm, length of head without jaws 2 mm, breadth of head 1,44 mm, length of prothorax 5,76 mm, breadth of prothorax 1,27 mm, breadth of abdomen 1,33 mm.

Worker. Body long and slender, dull white, head and two spots near the anterior margin of prothorax light rufous; tip of abdomen rounded.

Measurements: Length of body 5,7 mm, length of head 1,14 mm, breadth of head 1,13 mm, length of prothorax

0,57 mm, breadth of prothorax 1,18 mm, breadth of abdomen 1,24 mm.

This species is certainly nearly related to *C. brevicornis* FROGG., and it is only with hesitation that I have described it as new. If, however, FROGGATT's description is correct, it cannot be identical with his species. But unfortunately the illustration given by FROGGATT contradicts in some points his description. Thus, according to the description of *C. brevicornis* FROGG., the wings are »slender, twice as long as broad», but according to the fig. (6) Pl. XXXVI the wings are more than twice as long as broad. And the head of the soldier is according to the text »twice as long as broad», but according to the figure Pl. XXXVI, 6 a not so long. The peculiar nervature of the wings makes it, however, very probable that the two species are distinct. Also the colour and other characters differ. According to FROGGATT, the tibiæ in the imago of his species are »armed with five stout spines at the apex». In my species I have not found more than three.

The species seems to be limited in its distribution to the southern rain-forests. It lives in rotten logs, where I found irregular ducts and galleries. The winged insect appear in October. — Mt. Tambourine, S. Queensland.

8. *Calotermes (Glyptotermes) trilineatus* n. sp.

Imago (immature). Head pale yellow, a transverse band above clypeus and inner margin of jaws darkbrown, the rest dull white.

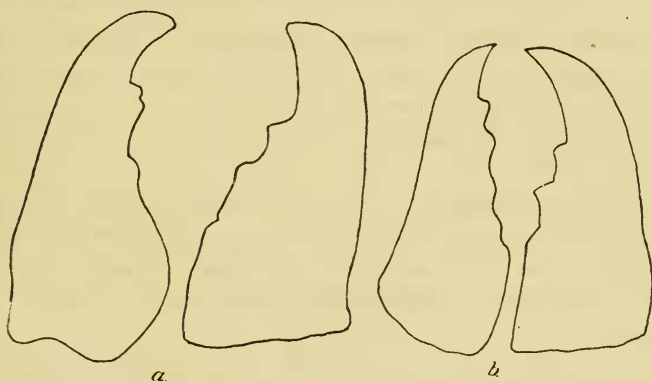
Head rounded, broadest near the eyes, clypeus whitish, short, labrum of about the same breadth, shell-shaped, at the angles and the tip; jaws broad, triangular, the left one with two apical, fairly sharp teeth, a rounded one near the middle and another very similar one near the base; eyes in the form of two dark spots on the sides; antennæ 16-jointed, light yellow, 4th and 5th joint very short, 7th and the following more rounded, broader at the tip, apical joint oval; prothorax much broader than long, emarginate at the anterior margin, with an impressed line following the broadly flattened sides round the anterior angles to about a third part of the margin, with an impressed median line; legs

moderate, thighs thick, tibiæ slender, armed with three strong, stout, darkly coloured apical spines; abdomen with two transversal rows of hairs, shining, rounded at the tip; cerci short, but stout, styli small.

Measurements: Length of body 8 mm, length of head 1,61 mm, breadth of head 1,52 mm, length of prothorax 0,76 mm, breadth of prothorax 1,56 mm, breadth of abdomen 2 mm.

Soldier (Text Fig. 11 b). Body elongate, with parallel sides, dull white, head light rufous.

Head much longer than broad, with parallel sides, cylindrical, hind angles broadly rounded, the anterior ones slightly projecting, a little darker coloured, with three more or less



Text Fig. 11. a Jaws of soldier of *Calotermes dubius* MJÖB. n. sp.
b » » » » *Calotermes trilineatus* MJÖB. n. sp.

distinct lighter parallel lines or the summit, impressed and sloping in front and there more lightly coloured, with fine punctures; the anterior part of clypeus well marked-off, semi-transparent, broad and flattened, rounded at the front angles and margin and there lighter coloured with a transversal row of erect stiff hairs, labrum longer than broad clypeus, but more narrow, broader than long, broadly rounded at the angles and at the apical margin, lighter coloured at the sides, reaching to about the middle of the jaws; jaws (Text Fig. 11 b) fairly short and stout, black at the tip, rufous at the base, crossing over each other with the tips, the left with five rounded teeth, two above, one in and two below the middle, the first and second the most protruding;

the right with three more or less triangular teeth in the middle; antennæ 13-jointed, short, the last six joints slightly oblique in the middle, being more prolonged at the interior angle, the 3rd joint very short; prothorax much broader than long, heart-shaped, emarginate at the front margin with impressed median line, slightly arcuate in the middle of the hind margin; meso- and metathorax slightly broader, rounded at the sides; legs of normal size, tibiæ armed with three stout apical spines, tips of claws darker; abdomen narrow, whitish.

Measurements: Length of body 7,2 mm, length of head with jaws 3,8 mm, length of head without jaws 3 mm, breadth of head 1,75 mm, length of prothorax 1,87 mm, breadth of prothorax 1,56 mm, breadth of abdomen 1,7 mm.

This species comes close to *C. eucalypti* FROGG. and *C. brevicornis* FROGG. From the former it differs (soldier) by the form of the head, its well-marked apical part of clypeus, the dentition of the right jaw, and its 13-jointed antennæ, from the latter by the much shorter head, the coloration, etc.

It is an inhabitant of the rainforests, where it lives in rotten logs, forming irregular ducts and galleries. I have taken specimens (no workers) at Cedar Creek (April) and Malanda (January), Queensland, together with half-grown imagines.

In the galleries of this termite lives the new *Cyphoderus serratus* SCHÖTT (see: Results of Dr E. MJÖBERG's Swedish Scientific Expeditions to Australia 1910—1913, 15, Collembola, p. 52).

9. *Calotermes (Glyptotermes) dubius* n. sp.

Imago (wingless). General colour castaneous-piceous; clypeus, labrum, palpi and antennæ light rufous.

Head small, rounded, broadest at the eyes, slightly depressed on the summit, apical part of clypeus broad and short, rounded at the sides, straight in front; labrum considerably more narrow, with parallel sides, slightly rounded at the tip, with a row of stiff hairs; jaws dark fuscous, the left with a strong apical and three other smaller teeth,

the right with three apical ones of about the same size and shape; antennæ defect, the joints rather thick and rounded, light rufous at the base, uncoloured at the tip; ocelli rounded in front, flattened at the posterior margin; eyes rounded, black, not very prominent; prothorax much broader than long, emarginate at the anterior margin, rounded at the anterior angles, tapering on the sides to the base; scapular shield of forewings large, triangular, sending out five strong free nervures into the membrane, fuscous; thighs incrassated, hind tibiæ long and slender, all tibiæ armed with three beautifully serrated spines; abdomen with dark-fuscous chitinous plates, bordered with fine hairs, with an impressed median line in the interstices between the plates, tip rounded.

Measurements: Length of body without wings 11 mm, length of head (to tip of labrum) 1,62 mm, breadth of head 1,24 mm, length of prothorax 0,68 mm, breadth of prothorax 1,14 mm, breadth of abdomen 1,6 mm.

Soldier (Text Fig. 11 a). General colour darker than in *C. trilineatus* MJÖB., body larger and more strongly built.

Head much longer than broad (see measurements), cylindrical, with parallel sides, posterior angles rounded, anterior ones more obtuse, slightly prominent, darkbrown-fuscous on the two posterior third parts, lighter rufous in front, here impressed and sloping forwards, with three lighter, parallel lines on the summit; apical part of clypeus well marked, its sides not so much rounded as in *C. trilineatus* MJÖB., but slightly sloping towards the front margin, the anterior angles obtuse, not so much rounded off as in *C. trilineatus* MJÖB.; labrum (the part thereof not covered by clypeus) much narrower, much broader than long, completely rounded towards the tip and here armed with long and stiff hairs, jaws (Text Fig. 11 a) stout and robust, fuscous at the base, black at the tips, crossing over each other, the left with a double tooth below the tip and a rounded one in the middle, the right with two triangular ones near the middle and a small incision further down; antennæ 14-jointed, basal joint stout and robust, 2nd a little shorter and not so broad, 3rd very short, much broader than long, 4th distinctly longer but shorter than the 5th, 5th to 13th longer and slender, broader at the tips, strongly hairy, apical joint more narrow, elon-

gate; prothorax about as broad as the head, much broader than long, fairly deeply emarginate in front, anterior angles broadly rounded, sides tapering towards the base, posterior margin slightly arcuate, light rufous, with two spots near the anterior margin, parts of the hind-margin and a slightly bent cross-marking in front of it dark fuscous, median line impressed; parts of the sides of meso- and metathorax more darkly coloured; thighs very thick and rounded, all tibiæ armed with three short and robust spines, hind tibiæ longer than the thighs, claws long and sharp.

Measurements: Length of body 10—12 mm, length of head with jaws 4,7 mm, length of head without jaws 2,8 mm, breadth of head 1,71 mm, length of prothorax 0,89 mm, breadth of prothorax 1,52 mm, breadth of abdomen 2 mm.

Queen. Very similar to the imago, only longer and stouter, and abdomen more extended. The chitinous plates of the dorsal segments 2—6 of the abdomen are well marked, having a lighter coloured spot on each side.

Measurements: Length of body 11 mm, length of head 1,61 mm, breadth of head 1,52 mm, length of prothorax 0,86 mm, breadth of prothorax 1,23 mm, breadth of abdomen 3 mm.

This seems to be the first known queen of the Australian *Calotermes*-species. In his work »Australian Termitidæ», Part II, where FROGGATT describes 12 Australian species the author says (p. 522): »I have never found a queen among any community of the genus.»

This species is apparently allied to *C. trilineatus* MJÖB. and *C. eucalypti* FROGG. From the former it differs by its larger size, longer and more darkly coloured head, the shape of clypeus, the 14-jointed antennæ etc. From the latter it differs by having larger soldiers with longer and darker head, well-marked apical part of clypeus (in *C. eucalypti* FROGG., according to FROGGATT, clypeus hidden!), the dentition of the jaws etc. — A typical inhabitant of the rain-forests; specimens taken at Herberton (January) and at Cedar Creek (with unwinged imago and queen, April), N. Queensland. It lives in rotten logs, forming irregular ducts and galleries.

III. Family *Mesotermitidæ* HOLMGR.10. *Leucotermes ferox* FROGG.

This species seems to have a very a very wide distribution. It is previously know from N. South Wales and W. Australia. My own material contains specimens (soldiers and workers) from Noonkanbah (N. W. Australia), Darling Range (W. Australia), Adelaide (S. Australia), Colosseum (S. Queensland), Yarrabah, Atherton and Cedar Creek (N. Queensland). — The specimens (soldiers) from certain localities are of larger size and more darkly coloured than from other ones. As SILVESTRI (Die Fauna Südwest-Australiens, Bd II, Lief. 171, 1909, p. 297, Isoptera) has pointed out, some of the soldiers are of larger size. I have not been able to find any structural differences between the soldiers from the different localities. — Lives under stones and logs in smaller communities, or in deserted nests of *Coptotermes lacteus* FROGG. Belongs to the open forest-country and does not enter the jungles.

11. *Coptotermes lacteus* FROGG.

The most common, and at the same time the most destructive, of the Australian termites. It is spread all over Australia and seems to vary slightly in the different places. According to FROGGATT, the soldier has 16-jointed antennæ and this seems to be the rule. SILVESTRI (l. c.) says that certain specimens from N. South Wales show only 14 joints. According to my own observations on a very large material, the number of joints varies from 15 to 16. — My material, contains specimens from Broome (N. W. Australia), Perth (W. Australia), Mt. Tambourine, Mapleton, Blackal Range, Yandina (S. Queensland), Millaa Millaa (rain-forest), Laura, Alice Rive (N. Queensland). It is typical of the open savannah-country, but enters occasionally into the jungles, where I have seen it attack the wood of green, living trees; — Nest and habits described by FROGGATT (l. c.).

12. *Coptotermes Michaelseni* SILV.

This species was recently described from S. W. Australia. It is apparently a distinct species and can easily be separated from *C. lacteus* FROGG. by the smaller size of the soldier, the differently shaped head, and the smaller 3rd joint of the antennæ, which have only 14 joints. It should be observed, however, that these characters are not always combined. Certain soldiers are more or less intermediate between the two species. To the typical species belong, no doubt, some winged insects, soldiers and workers, from the vicinity of Perth (under Eucalyptus-bark, ^{11/9}). I have referred to this species all small-headed soldiers with 14-jointed antennæ, and with the 3rd joint usually smaller than the 4th. — Localities: Perth (W. Australia), Adelaide (S. Australia), Christmas Creek (S. Queensland), Herberton, Cedar Creek (N. Queensland).

13. *Rhinotermes reticulatus* FROGG.

Several winged specimens taken by night at light (January, February) at Oscars Range (Spring station), Kimberley, N. W. Australia.

The species has apparently a wide distribution. Taken previously at Kalgooslic, W. Australia, and in Central Australia.

14. *Rhinotermes intermedius* BRAUER.

Winged specimens together with workers and soldiers taken at Yedda (^{18/1}), Kimberley, N. W. Australia (under rotten logs in Eucalyptus-bush) at the foot of Mt. Tambourine (October, under bark of the »mahogany-tree») and at Colosseum (October), S. Queensland.

Rhinotermus soldiers and workers in large number taken at Broome, Derby in N. W. Australia, at Yandina in S. Queensland and at Cedar Creek, Evelyne and Alice River in N. Queensland. To what species they belong to is impossible to say, as no morphological differences can be found between the soldiers and workers of the two very closely allied species. Judging from the fact, however, that *Rh.*

reticulatus FROGG. is spread more in the western and tropical parts of the continent and *Rh. intermedius* BRAUER hitherto has been recorded mostly from the eastern parts (N. South Wales, Queensland), it is probable that the specimens of soldiers and workers mentioned above from the Kimberley district belong to *Rh. reticulatus* FROGG., though *Rh. intermedius* BRAUER has also been recorded once from the tropical belt (Port Darwin) of Australia.

The soldiers and workers of the species in question from Kimberley were abundant at Derby. They appeared in millions on the dry ground at night, making a very audible noise in the dry leaves. Disturbed by light, the soldiers suddenly stopped, hammering with their large head against the substrate.

In the *Rhinotermes* galleries (no regular nests are constructed) live many inquilines such as staphylinids, podurids, etc. among them *Sinella termitum* SCHÖTT n. sp. and *Cyphoderus pseudalbinus* SCHÖTT n. sp. (see: Results of Dr. E. Mjöbergs Swedish Scientific Expeditions to Australia 1910—13, 15, Collembola, p. 20, 50).

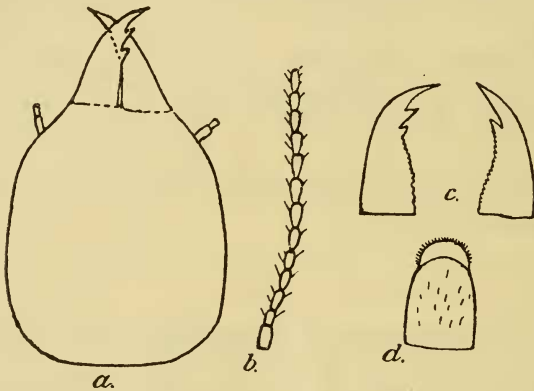
15. *Parrhinotermes queenslandicus* n. sp.

The genus *Parrhinotermes* was established by HOLMGREN (Termitenstudien II, 1911, p. 77—78) for two aberrant members of the family *Rhinotermitidæ*, *Rh. æqualis* HAV. and *Rh. inæqualis* HAV., both from Sarawak in Borneo. They differ from the true *Rhinotermes* species by having (soldier) only 13-jointed antennæ, differently shaped jaws and only one kind of soldiers. Three year later HOLMGREN (Wissenschaftl. Ergebnisse einer Forschungsreise nach Ostindien III, Zool. Jahrbücher, Bd 36, 2/3 Heft, 1914, p. 238) describes a third species, called *P. Butteli-reepeni*, from Central Sumatra, and gives at the same time the diagnosis of the imago.

Soldier (Text Fig. 12). General colour whitish yellow, jaws and labrum more deeply coloured, the former being bright rufous, the latter light yellow.

Head comparatively large, distinctly longer than broad, broadest before the hind angles, parallel on the sides, rounded in front, fairly flat on the summit, with scattered hairs;

clypeus not distinctly marked, flat with a lighter yellow longitudinal marking from the fontanel towards the labrum; labrum (Text Fig. 12 d) much longer than broad, rounded at the sides, tapering forwards, with a broad transparent rounded border in front, thickly armed with small fine hairs; jaws (Text Fig. 12 b) very strongly developed, dark rufous at the tip, lighter at the base, the apical part much bent inwards, the left jaw with two large, broad and leaf-like teeth above the middle, the right with one large tooth, the base of each jaw beautifully and finely serrated; antennæ springing from a deep cleft, the upper margin of which is more strongly chitinized and more deeply coloured, long and slender, basal



Text Fig. 12. a Head, b antenna, c jaws, d labrum of soldier of *Parrhinotermes queenslandicus* MjöB. n. sp.

joint not much broader than the following, 2nd shorter, 3rd distinctly longer, of the same size as the two following ones, 6th—12th rounded at the sides, apical joint ovate, more elongate; prothorax very much broader than long, slightly arcuate in the centre at the anterior margin, yellowish-white with a lighter median line, sides tapering sharply to the completely rounded hind angles, meso- and metathorax smaller; legs slender, hairy; abdomen strongly hairy, cerci stout.

Measurements: Length of body (with jaws) 4 cm, length of head (with the jaws crossing each other 1,52 mm, breadth of head 0,95 mm, length of prothorax 0,3 mm, breadth of prothorax 0,57 mm, breadth of abdomen 0,7 mm.

Worker. Whitish, head light yellowish, broad, rounded;

a dark spot on each side before the antennæ; labrum large, broad and rounded, jaws dark rufous at the inner margin, broad, the left with 6 rather sharp teeth, the right with only two; the basal part finely serrated; antennæ 13-jointed, 2nd and 3rd joint of about the same length but 2nd slightly broader, prothorax very small and narrow, emarginate in the front, with scattered erect hairs, meso- and metathorax much wider.

Measurements: Length of body 4,3 mm, length of head 1,06 mm, breadth of head 0,97 mm, length of prothorax 0,36 mm, breadth of prothorax 0,53 mm, breadth of abdomen 1,24 mm.

The new Australian species differs from *P. Butteli-reepeni* HOLMGR. amongst other things by having the tip of the jaws more sharply bent and the anterior tooth of the left jaw broad and leaf-like; from *P. inæqualis* HAV. it differs distinctly by the shape of the labrum, not being rectangular, but tapering on the sides towards the rounded tip; from *P. æqualis* HAV. it differs inter alia by the dentition of the jaws.

This species is an inhabitant of the rain-forests. Specimens (soldiers and workers) taken in rotten logs at Malanda (July), Herberton (January) and Bellenden Ker (May).

The discovery of a fourth new Australian species of this well-defined genus is of great interest. It shows that the *Parrhinotermes* species most likely are ancient forms, which in earlier days had a wider distribution. Further investigations may show that the genus is also represented in New Guinea.

IV. Family Metatermitidæ HOLMGR.

Genus *Eutermes* (HEËR) HAG.

Of the Australian termite genera this is undoubtedly the most difficult. Nine distinct species have hitherto been described by different authors, but further investigation will doubtless increase the number of species considerably. In the present material no less than eleven new species were represented, bringing the number of Australian species up to twenty.

Since FROGGATT (Australian Termitidæ II, III, Proceedings of the Linnean Soc. of W. S. Wales, 1876, 1891) de-

scribed seven species, among them the new ones, *E. magnus*, *E. triodiæ*, *E. pyriformis*, *E. hastilis*, *E. tumuli*, only two new ones, *E. apiocephalus* and *E. occasus*, have been added by SILVESTRI (Fauna Südwest-Australiens, Bd. II, Lief. 17, Isoptera 1919). It is, however, very much to be regretted that several of FROGGATT's new species are too briefly and generally described to permit a sure identification. This is particularly the case with his species *E. hastilis* and *E. triodiæ*. Neither these nor the species *E. magnus* and *E. pyriformis* seem to have



Foto E. Widberg.

Text Fig. 13. Nest of *Eutermes nigerrimus* MjöB. n. sp. from the Kimberley-District in N. W. Australia.

been re-discovered. At any rate no record or re-descriptions can be found in later literature. Fortunately I have been able to examine FROGGATT's own specimens of *E. magnus*, *E. pyriformis* and *E. tumuli* and have found them to be distinct forms. I have every reason to believe that this also is the case with his *E. triodiæ* and *E. hastilis*.

How little is known about the Australian *Eutermes*-species and the termite-fauna in general is shown by the fact that the species *E. nigerrimus* MjöB., which builds very

large mushroom-shaped nests of the so-called »Kimberley-typus» which were mentioned in 1897 by SAVILLE KENT, has hitherto remained unknown. It is about this nest that ESCHERISCH (Die Termiten oder weissen Ameisen, Leipzig 1909, p. 83) writes the following: »Eine sehr merkwürdige Abart der Hügeltypus representieren Die Nester einer im Kimberley-Distrikt (Nordaustralien) vorkommenden unbekanntes Art, welche SAVILLE KENT als 'Kimberley-Typus' bezeichnet».

In classifying the 12 different species I have made use of the different characters of the soldiers. The number of joints of the antennæ seems to be a very reliable character. Also the shape and colour of the head is a very constant character. In most cases I have tried to illustrate the descriptions with drawings taken from the microscope by a camera, thus giving a true picture of the part in question. Thus a large number of profiles of the head from the side and from above of the new species, as well as of the two very little known species, *E. pyriformis* FROGG. and *E. magnus* FROGG., are given.

Key

to the 19 hitherto described Australian *Eutermes*-species based upon the characters of the soldiers.

I. Antennæ 12-jointed.

A. Head sharply constricted across the middle.

1. *E. Pülleinei* MJÖB. (smaller soldier).

Distribution: Queensland.

(Text Fig. 28.)

B. Head not constricted across the middle.

2. *E. pluvialis* MJÖB.

Distribution: Queensland.

(Text Fig. 19 b.)

II. Antennæ 13-jointed.

A. Head ochreous with darker mouth.

3. *E. fumigatus* BR.

Distribution: Southern Australia.

(Text Fig. 18 c.)

B. Head dark chestnut with a profile of the type as shown in Plate 2, fig. 6.

E. fumipennis WALK. Imago with 13-jointed antenna.

Distribution: Southern Australia.

C. Head neither ochreous nor dark-chestnut coloured.

1. Snout strikingly long, broad and stout (of the type as shown by SILVESTRI in Fauna Südwest-Australiens, Bd II, Lief. 17, Isoptera, Taf. XXI, Fig. 213).

E. occasus SILV. Imago with 15-,
worker with 14-jointed antennæ.

Distribution: S. W. Australia.

2. Snout not strikingly long, broad or stout.

a. Only one kind of soldiers.

*. Head bright ferrugineous; very short.

E. hastilis FROGG. Imago and
worker with 15-jointed antennæ.

Distribution: Queensland.

**.

Head reddish-orange, head small, mouth long and narrow.

1. 3rd joint of antennæ distinctly longer than 2nd.

†. 3rd joint of antennæ longer than 4th.

E. apiocephalus SILV. Worker
with 14-jointed antennæ.

Distribution: W. Australia,
Queensland.

(Plate 2, Fig. 8.)

††. 3rd joint of antennæ shorter than 4th.

E. tumuli FROGG. Imago with 16-,
worker with 15-jointed antennæ.

Distribution: W. C. Australia.

(See SILVESTRI, l. c., Tab. XXI, Fig. 201-202.)

2. 3rd joint of antennæ of about the same length as 2nd, head more rounded on the sides and not tapering so much to the base of the mouth.

E. Aagaardi MjöB. Worker with
14-jointed antennæ.

Distribution: S. W. Australia.

(Text Fig. 27.)

b. More than one kind of soldiers.

*. Soldiers differing only in size and not in shape of the head.

E. eucalypti MjöB. Worker with
15-jointed antennæ.

Distribution: N. W. Australia.

(Text Fig. 26 b, c.)

**.

Soldiers differing in both size and shape of the head; smaller soldier with head strongly constricted across the middle.

E. Palleinei MjöB. Smaller soldier
with 12-jointed, larger with 13-jointed,
worker with 14-jointed antennæ.

Distribution: Queensland.

(Plate 2, Fig. 10, Text Figs 21 a, 26 a, 28.)

III. Antennæ 14-jointed.

A. Head constricted across the middle. Body exceedingly hairy.

E. Tyriei MJÖB. Worker with 15-jointed antennæ.

Distribution: N. Queensland.

(Text Fig. 29.)

B. Head not constricted cross over the middle. Body as a rule normally hairy.

1. Head almost quite black, with lighter median line.

E. nigerrimus MJÖB. Imago with 16-, worker with 15-jointed antennæ.

Distribution: N. Queensland.

(Text Fig. 16.)

2. Head not black, without lighter median line.

a. Head very rounded on the sides very nearly circular.

E. pyriformis FROGG. Imago with 16-, worker with 15-jointed antennæ.

Distribution: Queensland.

(Text Fig. 23.)

b. Head not circular, but tapering on the sides to the base of the snout.

*. 3rd and 4th joint of antennæ coalescing.

E. coalescens MJÖB. Worker with 15-jointed antennæ.

Distribution: S. W. Australia.

(Text Fig. 17 e.)

** 3rd and 4th joint of antennæ not coalescing.

†. Head light reddish brown; joints of antennæ not very long and slender.

a₁. 4th joint of antennæ much longer than the 3rd.

E. kimberleyensis MJÖB. Worker with 15-jointed antennæ.

Distribution: N. W. Australia.

(Plate 2, Fig. 5, Text Fig. 21 b.)

a₂. 4th joint of antennæ scarcely longer than the 3rd.

E. yarrabahensis MJÖB. Worker with 15-jointed antennæ.

Distribution: N. Queensland.

(Text Figs 18 b, 25.)

††. Head dark castaneous brown, joints of antennæ very long and slender.

a₁. Body large-sized, with the snout at least 4 mm long.

E. magnus FROGG. Imago very large, with 16-, worker with 15-jointed antennæ.

Distribution: N. Queensland.

(Text Fig. 22.)

a₂. Body small-sized, with the snout less than 4 mm long.

E. triodia FROGG. Imago very small with 15-, worker with 14-jointed antennæ.

Distribution: N. W. Australia.

Eutermes nigerrimus n. sp.

A very characteristic species with very dark and broad head and slender 14-jointed antennæ in the soldier. It is a relative to the North Australian species *E. pyriformis* FROGG. and *E. magnus* FROGG. but quite distinct from both.

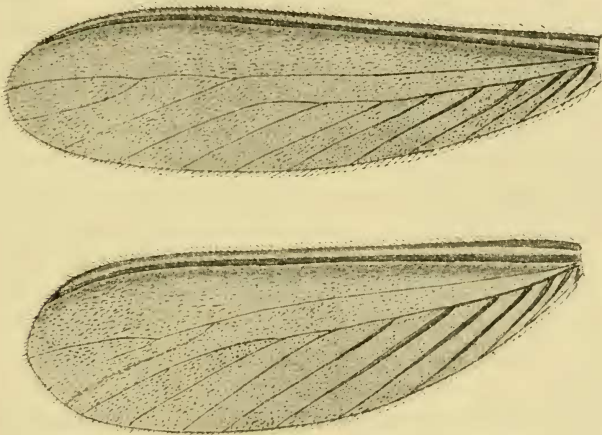


Text Fig. 14. Jaws of imago of *Eutermes nigerrimus* MjÖB. n. sp.

Imago (Text Figs. 13, 14, 15). Reddish-brown, head much darker, body stout and robust, wings very long.

Head broad, rounded, flattened at the summit, dark fuscous, thickly covered with hairs; eyes very large, rounded, projecting, coarsely faceted; basal portion of clypeus swelled, light yellowish-red, convex, apical portion lighter coloured, whitish, rounded in front; labrum long, convex, rounded in front; jaws very stout, nearly with the ordinary *Eutermes* dentition (see Text Fig. 14), antennæ 16-jointed, basal joint large and stout, 2nd only half so long as 1st, 3rd slightly longer, 4th shorter than 3rd and 5th, and following slightly longer than 3rd, the last 4 joints twice as long as broad, apical joint narrow, elongate, rounded at tip; ocelli large, slightly reniform, obliquely placed a certain distance away

from the inner margin of the eyes; prothorax large and broad, flattened, thickly covered with coarse hairs, broadly emarginate in front, the frontal border raised or elevated and darkly coloured, anterior angles rounded, sides tapering sharply backwards, hind angles completely rounded, hind margin with a slight median excision; meso- and metathorax with a dark-brown rounded spot in the centre and a darker, chitinous line connecting it at each side with the dark-brown frontal margin, wings (Text Fig. 15) very long and broad, light ferruginous brown with the two nervures at the front margin and (in the front wing) usually an irregular »wing-mark» at the end of both nervures darker, mediana running through

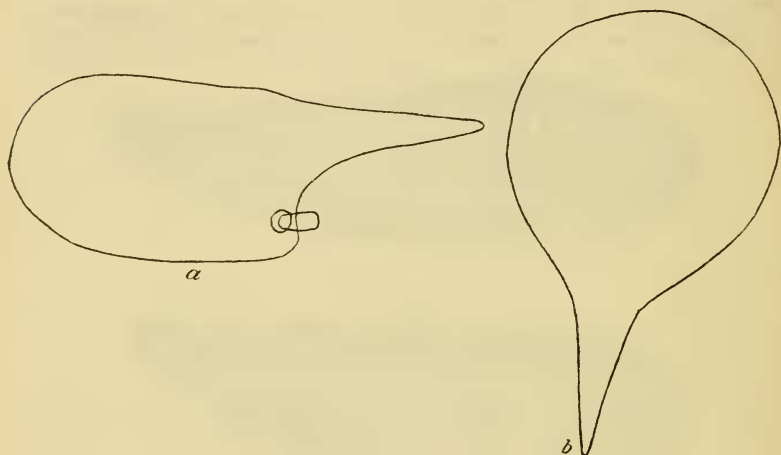


Text Fig. 15. Wings of *Eutermes nigerrimus* Mjöb. n. sp.

the upper part of the wing, sending out one unforked nervure to the hind margin and two, branching off from the same point, to the tip of the wing, cubitus sending out 9—10 oblique nervures to the hind margin; in the broader hind-wing the mediana runs higher up in the wing, and is forked at the tip, having sent out an unforked nervure to the hind border; cubitus sending out about 9 oblique nervures, the interior ones very thick and stout; legs light yellowish, very thickly hairy, apical spines of tibia and claws fuscous; abdomen very broad and stout, thickly hairy, banded with 9 transversal fuscous, chitinous plates, ventral segments with a light yellowish transversal band, and two rows of five darker rounded spots on each side.

Measurements: Length of body with wings 20 mm, length of body without wings 11 mm, length of head 2,13 mm, breadth¹ of head 1,92 mm, length of prothorax 1,05 mm, breadth of prothorax 1,84 mm, length of forewings 17 mm, breadth of forewings 4,8 mm, length of hindwings 16,2 mm, breadth of hindwings 5,2 mm, breadth of abdomen 2,6 mm.

Soldier (Text Fig. 16). A near relative to the species *E. pyriformis* FROGG. and *E. magnus* FROGG., but quite distinct from both.



Text Fig. 16. Shape of head of soldier of *Eutermes nigerrimus* MjöB. n. sp. a from the side, b from above.

Head very large, broad and rounded, though not so circular as in *E. pyriformis* FROGG. but tapering on the sides towards the long and thick snout, its greatest breadth behind the middle; snout dark, very nearly black as the other parts of the head (except an indistinct median lighter line) but rufous at tip; palpi long and slender; antennæ very long and slender, fuscous, darker than in the two other species, basal joint long and stout, 2nd only half so long and half so broad, 3rd much longer, more than twice as long as broad, 4th generally slightly shorter and broader, 5th to 9th about $2\frac{1}{2}$ so long as broad, 10th to 13th about twice as long as broad, distinctly shorter than the preceding ones, apical

¹ Reckoning from external margins of eyes.

joint the shortest (next to the 2nd), only half so long as the ones in the middle, prothorax ridged in front, dark-fuscous at the anterior margin, lighter coloured in its posterior half, broader than meso- and metathorax, which are light yellow with lighter median line; legs whitish yellow, long and slender; abdomen elongate, rounded at the sides, with yellowish dorsal chitinous plates and scattered stiff erect hairs.

Measurements: Length of body (to tip of snout) 5 mm, length of head 2,13 mm, breadth of head 1,35 mm, length of snout 0,87 mm, breadth of snout at base 0,51 mm, length of prothorax 0,27 mm, breadth of prothorax 0,7 mm, breadth of abdomen 1 mm.

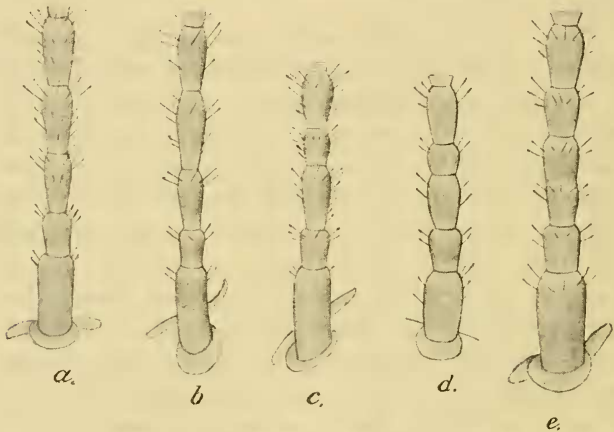
Worker. Whitish with very dark head. — Head broad and rounded, on the upper surface blotched with dark reddish-fuscous, divided by a median and a transversal broad white line into two broad posterior and one transversal anterior part, the latter with a lighter spot on each side; basal part of clypeus broader than the apical one, the latter truncate in front, labrum large, broad and convex; jaws very large, the left with two apical sharp teeth, a smaller one further below and a protruding triangular basal part, the right with two very large and sharp apical teeth, a smaller, more obtuse one directly below, and a large basal pointed part; antennæ whitish, 15-jointed, 3rd joint longer than 2nd, following ones not quite twice as long as broad, tapering on the sides to the base; prothorax ridged in front, rounded at the sides, with a light fuscous, chitinous cross-band, abdomen large, rounded.

Measurements: Length of body 5,4 mm, length of head 2,13 mm, breadth of head 1,62 mm, length of prothorax¹ 0,38 mm, breadth of prothorax 0,93 mm, breadth of abdomen 1,7 mm.

The soldier of this species has the darkest head of all Australian *Eutermes* species. It differs from *E. magnus* FROGG. (of which I have had specimens for examination determined by FROGGATT) by having the head much broader behind, a longer snout, and much longer and more slender antennæ, with the 3rd joint as long or slightly longer than the 4th,

¹ To give precise measurements of the length and breadth of prothorax is very difficult. Reservation must therefore be made for the accurate of the measurements given.

and the median joints longer and more slender, the apical ones considerably shorter. From *E. pyriformis* FROGG., to which species it apparently comes nearest, it differs by the very dark, almost black head with an indistinct median lighter line, by the less rounded sides which are more tapering towards the slightly broader and stouter snout, by the more slender, longer and darker coloured antennæ, etc. In general appearance it is very much like the New Guinea species *E. princeps* DESN., specimens of which have been kindly placed at my disposal by Dr. NILS HOLMGREN; it has the same darkly coloured head with a lighter median line, but on



Text Fig. 17. *a* Basal joints of antenna of *Eutermes nigerrimus* MJÖB. n. sp.
b » » » » » » *Tyriei* MJÖB. n. sp.
c » » » » » » *fumipennis* WALK.
d » » » » » » *Pulleinei* MJÖB. n. sp.
 (larger soldier).
e » » » » » » *coalescens* MJÖB.

closer examination, it proves to be quite another species, having 14-jointed antennæ with very long and slender joints (in *E. princeps* DESN. 13-jointed antennæ with quite different joints).

I have found this species in the very characteristic large mushroom-shaped nests of red clay or sand as a cover and the more brittle darkly coloured, internal galleries which are so typical of the Kimberley landscape (see Text Fig. 13) in North-west Australia. I observed exactly the same type of nest in the open savannah country near Evelyne and Cedar Creek in North Queensland; they were inhabited by the same dark-

headed soldiers and workers which I have described below as a variety. Further up north on the Cape York Peninsula, the same species builds taller nests consisting of a central body with many parallel lateral column-shaped lateral parts as shown in Plate 4, Fig. 2. It attains a height of more than three meters.

Localities: Derby, Broome, Noonkanbah, Oscar Range (winged insects in February) in North-West Australia, and Laura and Alice River in North-Queensland.

16 b. *Eutermes nigerrimus* MJÖB. v. *queenslandicus* n. v.

Head of soldier smaller, not quite so broad and rounded behind, antennæ darker coloured, joints not so long and slender, 3rd joint always shorter than 4th, 5th to 9th joints hardly more than twice as long as broad.

Measurements: Length of body 4,7 mm, length of head 1,79 mm, length of snout 0,7 mm, breadth of snout at base 0,4 mm, breadth of head 1 mm, breadth of abdomen 1,05 mm.

This is a more southern form, living in the open forest-country at Cedar Creek and Evelyne in North Queensland. Deserves perhaps to be taken as a distinct species. Lives in reddish nests similar in form and shape to those of the head species from the Kimberley district.

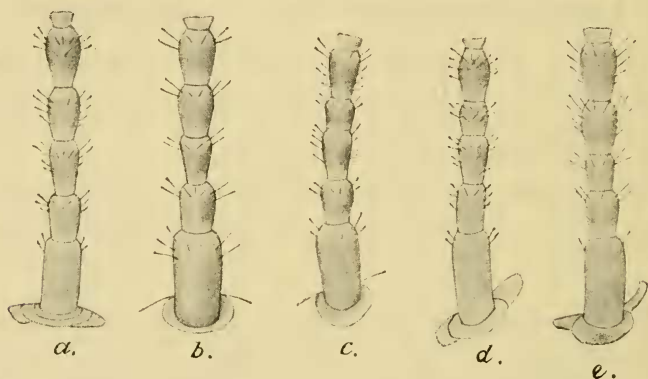
17. *Eutermes fumipennis* WALK.

(Plate 2, Fig. 6, Text Fig. 17 b.)

This very widely distributed species has been recorded from the most different localities of the continent. It does not seem, however, to live within the sub-tropical parts. — The species is easily identified on the characteristic profile of the soldier's head (Plate 2, fig. 6). It builds its nest, the so-called »negrohead» either on the ground on stumps or logs or up in the trees (as illustrated in Text Fig. 58 a, 62). Outside of Sydney one very often sees those arboreal nests. The duct leading up from the ground to the nest is covered up with dark, wooden, chewed material. In southern Queensland, at Mapleton on Blackal Range, I have observed the arboreal

nest of this species at a height of about 40 metres, placed in the very top of a tall *Eucalyptus* on the first horizontal place between the main branches (Text Fig. 61). The duct leading up from the ground is plainly visible at a good distance as a dark line along the lighter trunk of the tree, which has been killed by »ringbarking».

My collections contain material of soldiers and workers from the following localities: Adelaide (S. Australia), Bookvale, Sydney (N. S. Wales), Mt. Tambourine, Christmas Creek, Yandina, Blackal Range, Mapleton (S. Queensland), Cedar Creek, Carrington (N. Queensland).



Text Fig. 18. *a* Basal joints of soldier of *Eutermes pluvialis* MjöB. n. sp.
b » » » » » » *yarrabahensis* MjöB. n. sp.
c » » » » » » *eucalypti* MjöB. n. sp.
d » » » » » » *Aagaardi* MjöB. n. sp.
e » » » » » » *fumigatus* BR. (fr. Perth, W. A.).

18. *Eutermes fumigatus* BR.

(Text Fig. 19.)

Soldiers and workers taken at Perth (W. Australia) under bark and at Mt. Lofty (S. Australia) under stones near the roots of a tree. — Hitherto recorded only from N. South Wales.

My specimens agree in details with specimens determined by FROGGATT as *E. fumigatus* BR.

As a variety of this species I preliminary refer a light-headed species from Christmas Creek in South Queensland. The soldiers have the same size, shape and colour of the head, but the body is slightly larger.

The imago of *Eutermes fumigatus* BR. has 15-jointed, not 14-jointed antennæ as stated by FROGGATT.

In the very simple nest of this species, consisting only of some few irregular ducts and galleries, lived the very peculiar *Eucurtia paradoxa* MJÖB. of the family *Histeridæ*, described and figured by the author in Ent. Tidskrift 1912, p. 121—124, Taf. I.

19. *Eutermes pluvialis* n. sp.

Imago. General colour ochreous, head dark-castaneous, eyes black, wings dark-fuscous, dorsal side of thoracic segments, an oval spot on each side of meso- and metathorax, and chitinous plates of abdomen, dark-brown.

Head rounded, thickly hairy, flattened on the summit, dark-brown except the basal part of clypeus, ocelli and palpi, which are ochreous, front broadly excised, basal part of clypeus truncate in front, divided by a darker median suture, apical part whitish, slightly produced in the middle in front, with a whitish median line; labrum large, rounded in front; jaws broad, triangular, the left with a very sharp apical tooth, a more obtuse one below, united with a third, obtuse one further down by a rounded sharp portion and at the basal corner another large and obtuse one, the right with two obtuse angular teeth and a finely serrated darker basal part; eyes large and rounded, ocelli large ovi-form, obliquely placed and situated some way apart from the interior border of the eyes; the »fontanelle» in the shape of a narrow whitish streak in the middle of the front; antennæ 14-jointed, long and slender, dark-brown-castaneous, lighter coloured at the tip and at the base, basal joint very long and stout, 2nd much smaller, 3rd slightly longer and not so broad, 4th and following longer than broad, rounded at the sides, much broader at tip than at the base, 13th and 14th longest, the latter elongate, rounded at the tip; prothorax much broader than long, not so broad as the head, dark castaneous round the margin, truncate in front, with a lighter median line, thickly covered with long hairs, anterior angles broadly rounded, sloping sharply backwards, deeply excised in the centre of the hind margin; meso- and metathorax light

fuscous, with a lighter median line; legs normally developed, thighs and tibiæ about equally long, tarsi short; wings clouded with greyish-fuscous, anterior two nervures strongly developed, running out to the tip, which is broadly rounded, more than three (very nearly four) times longer than broad, mediana running slightly above the middle of the wing, forked at the tip and occasionally sending out an unbranched straight nervure to the border, cubitus sending out 4—5 oblique very stout nervures and 7—8 fainter ones; abdomen elongate, rounded, richly covered with hairs; cerci stout, darkly coloured.

Measurements: Length of body with wings 14 mm, length of body without wings 7,5 mm, length of head 1,37 mm, breadth of head 1,18 mm, length of prothorax 0,59 mm, breadth of prothorax 0,89 mm, length of forewing 11 mm, breadth of forewing 3 mm, length of hindwing 11,5 mm, breadth of hindwing 3,5 mm, breadth of abdomen 2 mm.

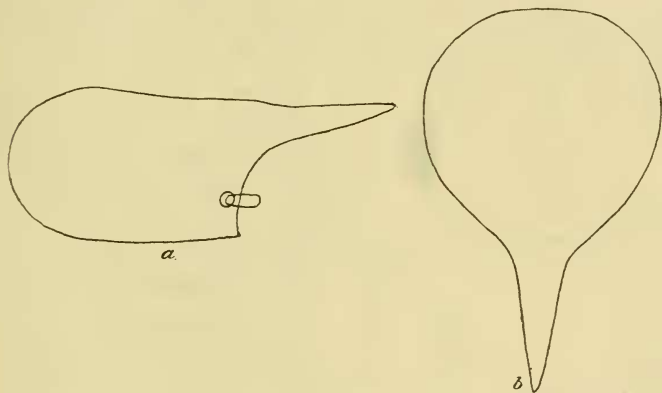
Queen. Much smaller than e. g. the queen of *E. magnus* FROGG., whitish yellow with head, thoracic segments, legs, and ten chitinous plates of the abdomen darker, the first of the latter rounded at the sides, the following seven rectangular, the two last smaller and rounded at the sides, the four first segments very much wider and more swelled than the following ones (occasionally or normally?).

Measurements: Length of body 14,2 mm, length of head 1,37 mm, breadth of head 1,18 mm, length of prothorax 0,59 mm, breadth of prothorax 0,89 mm, breadth of abdomen (across the 4th segment) 4,6 mm.

Soldier (Text Fig. 19, 20 b). Similar to the soldier of *E. fumipennis* WALK., but head smaller with the sides more tapering to the snout, much lighter in colour, light fuscous, with a broad patch in the middle of the hind head and the region round the cleft of antennæ much lighter; the shape of the head as shown by the profile fig. entirely different; antennæ 12-jointed (always) basal joint fairly stout, but not quite so broad as in *E. fumipennis* WALK., 2nd much smaller, about a third part in length of the basal one, 3rd longer than 2nd, much broader at the tip than at the base, 4th not quite so long as the 3rd, longer than broad, much longer and much more rounded at the sides than in *E. fumipennis* WALK.,

which has the 4th joint very small and much broader than long (se Fig. 18 e), 5th to 11th becoming longer and more slender, lighter in colour at the tip and at the base, 12th slightly longer and more slender than in *E. fumipennis* WALK., palpi long and slender, light fuscous; prothorax very small, front margin raised to a frontal, darkly coloured ridge; legs longer and more slender than in *E. fumipennis* WALK., whitish yellow; abdomen slender, rounded; cerci stout.

Measurements: Length of body 3,5 mm, length of head 1,46 mm, length of snout 0,93 mm, breadth of snout at base 0,17 mm, breadth of head 0,82 mm, length of prothorax



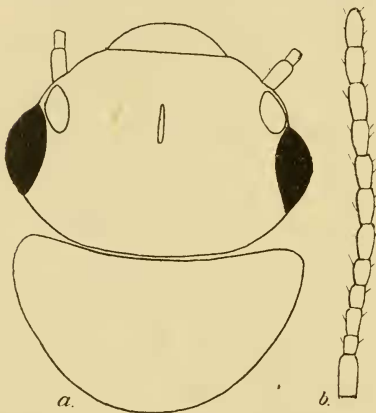
Text Fig. 19. Shape of head of soldier of *Eutermes pluvialis* MJÖB. *a* from the side, *b* from above.

0,27 mm, breadth of prothorax 0,48 mm, breadth of abdomen 0,91 mm.

Worker. Whitish, head light brown with a large blotch of darker reddish-brown or light-yellowish covering the upper surface, divided down the middle by a lighter whitish yellow band meeting in front a lighter cross-band, with a well-marked dark chitinous spot at either side in front of the antennæ, in the hind head a short whitish line on either side of the median band; basal part of clypeus rounded, convex, apical part impressed at base, rounded at the sides tapering towards the rounded tip, labrum large, broad, convex, rounded at tip, jaws triangular, the left with two sharp apical teeth, a much smaller obtuse one further below, and a black protruding basal angular one, the right with two not quite so sharp

apical ones, but without a smaller one corresponding to the smaller third of the left jaw, basal corner broad, black, finely serrated; antennæ 13-jointed, pale yellowish, basal joint fairly slender, 2nd only half so long, 3rd shortest of all, the following 5 broader than long, 9th—12th longer than broad, 13th more slender, elongate, rounded at tip, prothorax narrow, raised in front to a ridge, saddle-shaped; legs comparatively short; abdomen rounded, dorsal plates light yellow.

Measurements: Length of body 4 mm, length of head 1,2 mm, breadth of head 0,95 mm, length of prothorax 0,29 mm, breadth prothorax 0,59 mm, breadth of abdomen 1,18 mm.



Text Fig. 20. *a* Head and prothorax of imago of *Eutermes ocellaris* MjöB. n. sp.

b. Antenna of soldier of *Eutermes pluvialis* MjöB. n. sp.

A very typical species, allied to *E. fumipennis* WALK. but distinct from this as well as from all other Australian species, in many respects. The winged insect has only 14-jointed antennæ, which is the case with only one of the already known species, *E. fumigatus* BR. But, whereas this latter species has the antennæ in the soldier and worker 13- respectively 14-

jointed, our new species shows only 12- respectively 13-jointed antennæ in the soldier and the worker. It is the only one of the hitherto known Australian species with 13-jointed antennæ in the worker. In *E. tumuli* FROGG. the soldier has — apart from many other differences — according to FROGGATT only 12-jointed but in reality, as shown on pag. 35, 13-jointed antennæ, and the imago of the same species shows 16 joints and the worker 15 joints in the antennæ.

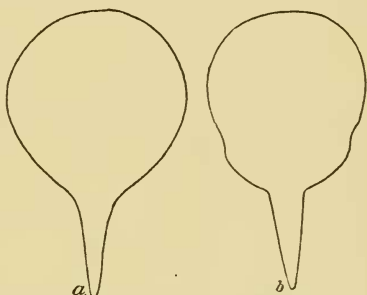
The new species seems to be limited in its distribution to the eastern parts of the Australian continent, being an inhabitant of the rain-forests or jungles. My material contains specimens from Blackal Range and Mt. Tambourine (southern Queensland), Herberton, Malanda and Cedar Creek (winged insects in April) within the large belt of scrub of the Ather-ton—Herberton tableland in North Queensland.

26. *Eutermes kimberleyensis* n. sp.

Soldier (Plate 2, Fig. 5, Text Fig. 21 b). Of about the same size as the soldier of *E. fumipennis* WALK.; head light reddish brown, broad and rounded behind, tapering markedly at the sides towards the short and stout slightly darker snout, slightly impressed in front (see profile Pl. 2, Fig. 5) and slightly constricted before the rostrum and straight on the sides as shown by Text Fig. 21 a; antennæ distinctly 14-jointed, long and slender, light yellow, lighter coloured at the base and at the tip, basal joint long and stout, 2nd hardly half so long, 3rd of about the same size, 4th much longer, 5th slightly shorter, 6th of the same size as 4th, 7th to 13th gradually longer, nearly three times as long as broad; prothorax saddle-shaped, raised in the front to a darkly coloured ridge, with a light median line; legs very long and slender, abdomen with dorsal chitinous plates light yellow; cerci stout, yellowish.

Measurements: Length of body 4 mm, length of head 1,48 mm, length of snout 0,53 mm, breadth of snout at base 0,19 mm, breadth of head 0,97 mm, length of prothorax 0,29 mm, breadth of prothorax 0,57 mm, breadth of abdomen 0,87 mm.

Worker. Head light reddish yellow, with a lighter median line and an oblique cross-suture dividing the reddish colour into three sections, two lateral ones and one frontal one, rounded at the sides and behind, broadest in front of the antennæ; basal part of clypeus broad and convex, divided by a light median line, apical part whitish, protruding in an obtuse tip in the middle of the front margin; labrum broad and slightly rounded in front, sharply tapering on the sides to the base; jaw stout, triangular, with the ordinary *Eutermes* dentition, but the teeth very often worn and irregular in shape; antennæ whitish, 15-jointed, 3rd joint slightly longer than the fourth, the following ones about twice as long as

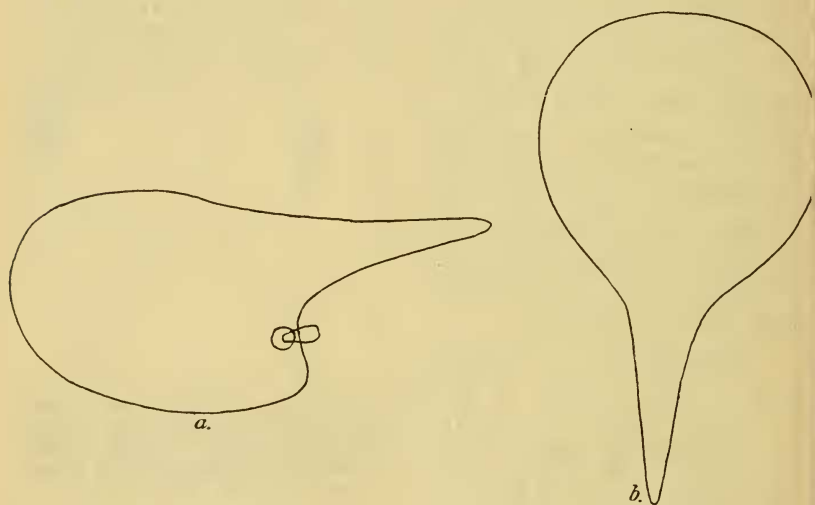


Text Fig. 21. a Shape of head from above of soldier of *Eutermes kimberleyensis* MJÖB. n. sp. b Shape of head from above of larger soldier of *Eutermes Pulleinei* MJÖB. n. sp.

broad, apical joint not quite so long as the 14th, elongate, rounded at tip, prothorax raised to a ridge in front, excised in the middle, abdomen oval, rounded.

Measurements: Length of body 6 mm, length of head 1,62 mm, breadth of head 1,54 mm, length of prothorax 0,58 mm, breadth of prothorax 0,8 mm, breadth of abdomen 1,62 mm.

This species builds reddish nests up to two meters in height of elongate, more or less column-like shape, in the open dry savannah forests in West Kimberley as showed by Text Figs. 59, 60. The cover of the nest is about two inches thick and

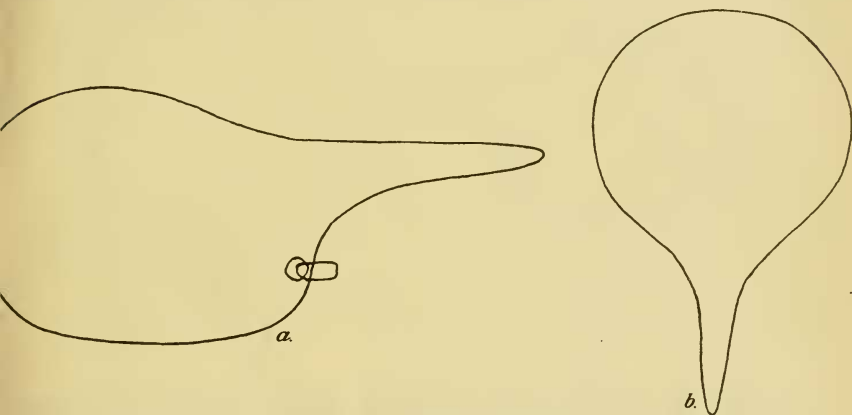


Text Fig. 22. Profile of head of soldier of *Eutermes magnus* FROGG. *a* from the side, *b* from above.

consists of hard sandy and earthy substances; the interior is made of a much softer, darker material of chewed wooden substance, in which the galleries are excavated; the latter are separated from each other only by a thin wall and are very often quite full of small pieces of grass, which are dried up in the more externally situated galleries (for disinfection!) and are then transported to the central and more basal parts of the nest, where they are chewed to powder and used as food for the young.

The species is apparently quite distinct from those already described. Perhaps it is allied to *E. hastilis* FROGG.

and *E. triodia* FROGG., but unfortunately the descriptions of these species are too vague and far too general to permit of an absolutely certain identification. Judging from FROGGATT'S descriptions, however, the new species differs from *E. hastilis* FROGG. by its larger size of the soldier, its 14-jointed antennæ with the 2nd joint only a third part in length of the basal one (in *E. hastilis* FROGG. 13 joints and the »2nd about half the size» of the basal one), the larger size of the worker, etc. From *E. triodia* FROGG. it differs by the somewhat larger size and much lighter colour of the head in the soldier, the larger-sized worker, its dentition of jaws and the 15-jointed antennæ. *E. magnus* FROGG. from North Australia is of larger size and



Text Fig. 23. Shape of head of *Eutermes pyriformis* FROGG.
a from the side, *b* from above.

has a much stouter basal joint of the slightly stouter antennæ, a broader and much darker head, broader mouth etc.

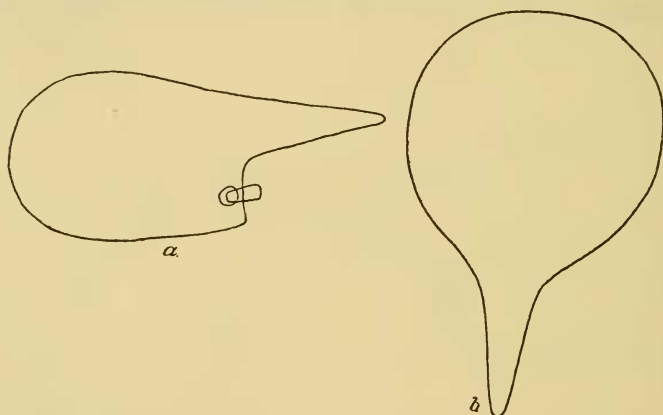
I have specimens (from the nest) from the vicinity of Derby in North West Australia.

21. *Eutermes coalescens* n. sp.

Soldier (Text Figs. 17, 24). Of the same size and general appearance as *E. kimberleyensis* MJÖB., but the head differently shaped and its colour more orange-reddish, rostrum broader and stouter at the base and the antennæ not so long, but more slender, with the 3rd and 4th joint mostly coalescing.

Head reddish orange, broad and rounded behind, tapering sharply to the rostrum; antennæ long and slender, the joints, however, not so broad and long as in *E. kimberleyensis* MjöB., third joint much shorter and not so broad, coalescing with the 4th, which is of about the same length as the 5rd (see Text Fig. 17 e), following joints about twice as long as broad, slightly darker than in *E. kimberleyensis* MjöB.; prothorax slightly broader; in other respects very similar to that species.

Measurements: Length of body 4 mm, length of head 1,44 mm, length of snout 0,56 mm, breath of snout at base



Text Fig. 24. Shape of head of soldier of *Eutermes coalescens* MjöB. n. sp. *a* from the side, *b* from above.

0,25 mm, length of prothorax 0,29 mm, breadth of prothorax 0,53 mm, breadth of abdomen 0,82 mm.

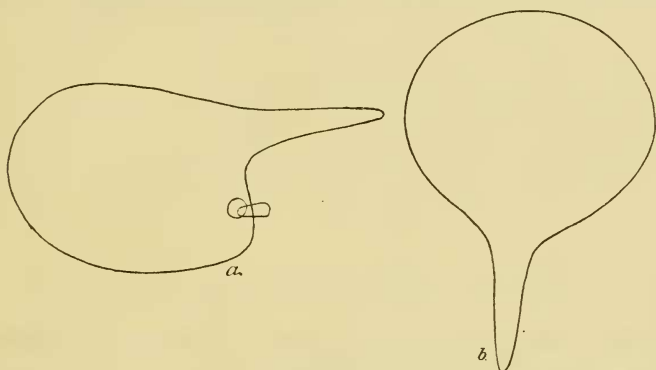
Worker. Very similar to that of *E. kimberleyensis* MjöB., but head more reddish-orange on the upper surface; the joints of antennæ (15-jointed) are slightly longer and more lightly coloured.

Measurements: Length of body 5 mm, length of head 1,62 mm, breadth of head 1,37 mm, length of prothorax 0,42 mm, breadth of prothorax 0,8 mm, breadth of abdomen 1,5 mm.

I have taken my specimens under bark at Mundaring in S. W. Australia (²²/₈ 1911).

22. *Eutermes yarrabahensis* n. sp.

Soldier (Text Fig. 25). Head viewed from above more narrow, and much more rounded at the hind margin, than in *E. kimberleyensis* MJÖB., sharply tapering to the base of the snout, which is slightly broader and stouter, colour of head very similar, antennæ 14-jointed, 4th joint much shorter than in *E. kimberleyensis* MJÖB., hardly longer than the 3rd, the following joints not so long as in *E. kimberleyensis* MJÖB., only twice as long as broad; chitinous plates of abdomen light yellowish; in other respects very similar.



Text Fig. 25. Shape of head of soldier of *Eutermes yarrabahensis* MJÖB. n. sp. a from the side, b from above.

Measurements: Length of body 4,5 mm, length of head 1,62 mm, length of snout at base 0,63 mm, breadth of snout at base 0,32 mm, breadth of head 0,89 mm, length of prothorax 0,34 mm, breadth of prothorax 0,57 mm, breadth of abdomen 0,89 mm.

Worker. Smaller and head reddish brown, more darkly coloured than in *E. kimberleyensis* MJÖB.; antennæ 15-jointed.

Measurements: Length of body 5 mm, length of head 1,41 mm, breadth of head 1,27 mm, length of prothorax 0,3 mm, breadth of prothorax 0,48 mm, breadth of abdomen 1,52 mm.

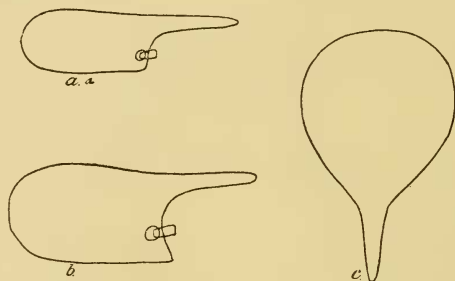
Closely allied to *E. kimberleyensis* MJÖB. of which it possibly might be regarded as a variety; as the shape of the

head and the antennæ in the soldier, however, are invariably different to those of the former species in all specimens examined by me, I consider myself justified in ranking it as a distinct species.

Soldiers and workers taken at Yarrabah, N. Queensland. It builds small about two feet high conical nests on sandy ground.

23. *Eutermes eucalypti* n. sp.

Soldier larger (Text Fig. 18 c, 26 b, c). Head comparatively small, rufous, with a castaneous broad band across the forehead, but broadly interrupted by a lighter line in



Text Fig. 26. *a* Shape of head from the side of smaller soldier of *Eutermes Pulleinei* MjÖB. n. sp.
b Shape of head from the side of larger soldier of *Eutermes eucalypti* MjÖB. n. sp.
c Shape of head from above of *Eutermes eucalypti* MjÖB. n. sp.

the centre, mouth slightly darker, rounded at the hind margin and at the sides, tapering sharply to the short and fairly stout snout; as for the profile see Text Fig. 26 b; antennæ 13-jointed, long and slender, basal joint long and stout, 2nd not so broad and only about half so long, 3rd distinctly longer, broader at tip than at the base, twice as long as 4th, which is the shortest, 5th much longer than the 4th, but shorter than the 7rd (see Text Fig. 18 c), 6th to 12th about twice as long as broad, 13th elongate, rounded at tip, joints light brown with lighter base and tip.

Measurements: Length of body 3,2 mm, length of head 1,35 mm, length of snout 0,51 mm, breadth of snout at base 0,19 mm, breadth of head 0,82 mm, length of pro-

thorax 0,21 mm, breadth of prothorax 0,48 mm, breadth of abdomen 0.84 mm.

Soldier (smaller). Same characters as the larger.

Measurements: Length of body 1,27 mm, length of head 0,82 mm, length of snout 0,48 mm, breadth of snout at base 0,17 mm, length of prothorax 0,23 mm, breadth of prothorax 0,42 mm, breadth of abdomen 0,6 mm.

Worker. Of the usual *Eutermes* type; head shining, posterior half blotched with darker reddish-brown, contracted in front before the antennæ; 3rd joint of antennæ very small, shorter than the 2nd and the 4th distal joints more than twice as long as broad, the 15th slightly shorter than the 14th.

Measurements: Length of body 5 mm, length of head 1,56 mm, breadth of head 1,27 mm, length of prothorax 0,29 mm, breadth of prothorax 0,68 mm, breadth of abdomen 1,48 mm.

I have found this very typical species under the bark of gum trees in the Kimberley-District of N. W. Australia. It does not seem to build a regular nest, but covers up its galleries and ducts by means of a clayey substance.

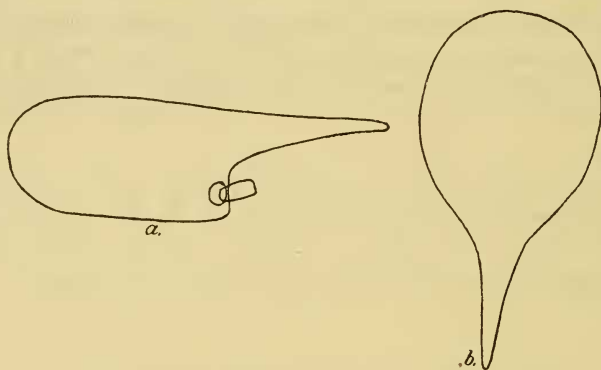
24. *Eutermes* (*Tumulitermes*) *Aagaardi* n. sp.

Soldier (Text Figs. 18 d, 27). Head reddish-orange, small, rounded behind and at the sides, the snout fairly short and stout; antennæ (Text Fig. 18 d), 13-jointed,¹ darker coloured than in *E. tumuli* FROGG. and *E. apiocephalus* SILV., basal joint stout and slightly bent inwards. 2nd half so broad and half so long as the 1st, with nearly parallel sides, 3rd of about the same length as 2nd (in the two species mentioned the 3rd joint is distinctly longer than the 2nd), broadest at the tip, 4th considerably shorter, 5th of the same size as the 3rd, 6th to 12th shorter and not quite so broad as in the other two species, not twice as long as broad, 13th rounded at tip, elongate, prothorax raised to a ridge in front, with a whitish median line: abdomen greatly constricted at base, rounded at the sides.

¹ According to FROGGATT the soldier of *E. tumuli* FROGG. has only 12-jointed antennæ, but specimens determined by FROGGATT which I have at my disposal show 13 distinct joints.

Measurements: Length of body 4,1 mm, length of head 1,29 mm, length of snout 0,51 mm, breadth of snout at base 0,19 mm, breadth of head 0,65 mm, length of prothorax 0,17 mm, breadth of prothorax 0,44 mm, breadth of abdomen 0,95 mm.

Worker. Small in size, head light reddish-orange, antennæ 14-jointed, 3rd and still more 4th joints very short, 7th, 8th about as broad as long, 9th 13th distinctly longer than broad, 14th more narrow, elongate, slightly tapering to the tip.



Text Fig. 27. Shape of head of soldier of *Eutermes Aagaardi* MJÖB. n. sp. *a* from the side, *b* from above.

Measurements: Length of body 3,6 mm, length of head 1,08 mm, breadth of head 0,99 mm, length of prothorax 0,23 mm, breadth of prothorax 0,57 mm, breadth of abdomen 1,27 mm.

Closely allied to the species *E. tumuli* FROGG. and *E. apiocephalus* SILV., but differing from the former by the more rounded head and the broader and stouter snout, from the latter by the shape of the head with its sides less tapering to the snout, and by the structure of the antennæ: several soldiers and workers under a sheet of bark on the ground at Mundaring in S. W. Australia.

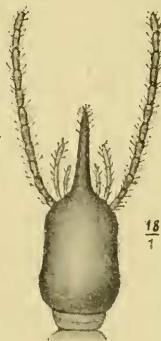
25. *Eutermes* (*Tumulitermes*) *apiocephalus* SILV.

(Plate 2, Fig. 8.)

Some soldiers and workers from Christmas Creek in southern Queensland and from Harm Creek on the Cape York Peninsula undoubtedly belong to this species, which was recently described by SILVESTRI from South West Australia. At least it has been impossible for me to find any structural differences between my own soldiers and the type specimens of SILVESTRI which Dr. HOLMGREN kindly has placed at my disposal. Some of the soldiers seems to have 15-jointed antennæ, the 3rd joint being divided by a false suture. But in all other respects my species is identical with SILVESTRI's.

26. *Eutermes* (*Trinervitermes*) *Pulleinei* n. sp.

Soldier (larger) (Plate 2, Fig. 10, Text Fig. 21 b). Head dark reddish-orange, snout slightly darker. Head very rounded behind and on the sides, depressed in the front in the profile (see Pl. 2, Fig. 10) broadest behind, tapering on the sides to the snout, anterior half of the lower margin beneath the antennæ black, snout short and stout; antennæ 13-jointed, fuscous, basal joint long and stout, 2nd longer than broad but only half so long as the 1st, 3rd slightly longer than 2nd, tapering on the sides to the base, 4th and 5th coalescing, only separated by a faint suture in shape of a lighter cross-line, 4th much shorter than 5th, 5th and following considerably longer than broad, lighter at tip and base; prothorax ridged in front, saddle-shaped, mesothorax with the anterior half yellowish, metathorax with a light yellow cross-band over the centre, the anterior half lighter yellow; legs comparatively short; abdomen very narrow at the base and rounded at the sides, dorsal chitinous plates light yellow.



Text Fig. 28. Head and prothorax of smaller soldier of *Eutermes Pulleinei* MJÖB. n. sp.

Measurements: Length of body 3 mm, length of head 1,37 mm, length of snout 0,53 mm, breadth of snout at base 0,15 mm, breadth of head 0,70 mm, length of prothorax

0,25 mm, breadth of prothorax 0,49 mm, breadth of abdomen 0,67 mm.

Soldier (smaller, Text Fig. 26 a, 28). Whitish-yellow, head dark reddish orange, antennæ light fuscous.

Head very small and narrow, strongly constricted cross over the middle (see Text Fig. 28) swelling out again above the root of antennæ, rounded behind and at the sides, snout fairly stout and tapering sharply to the tip, not so long as the head itself; antennæ only 12-jointed, basal joint stout, 2nd and 3rd much smaller of about the same length, but the 2nd with more parallel sides and the 4th tapering on the sides to the base, 4th slightly longer and broader, 5th and following much longer (though not twice) than broad; prothorax small, raised in front, saddleshape, meso- and metathorax with yellowish crossbands; legs comparatively short; abdomen rounded at the sides, elongate, narrow at the base, dorsal chitinous plates light yellow; cerci well developed, long.

Measurements: Length of body 2,8 mm, length of head 1,06 mm, length of snout 0,48 mm, breadth of snout at base 0,13 mm, breadth of head 0,51 mm, length of prothorax 0,13 mm, breadth of prothorax 0,32 mm, breadth of abdomen 0,65 mm.

Worker. Light whitish-yellow, upper surface of the head blotched with light reddish-yellow, divided by a light median line on each side; basal part of clypeus whitish, convex, rounded at base and sides, truncate in front, apical portion much smaller, slightly protruding in the centre; labrum narrow at the base, swelling out at the tip, convex; antennæ 14-jointed, light yellow, 3rd joint longer, 4th very short, only half as long as broad, 5th and following more slender, $1\frac{1}{2}$ so long as broad; jaws stout, triangular, the left with two apical teeth, a smaller one further below, and a strong protruding basal part; the right with three more obtuse ones and a broad black basal portion; prothorax raised in front; abdomen broad and rounded.

Measurements: Length of body 3,8 mm, length of head 1,52 mm, breadth of head 0,99 mm, length of prothorax 0,25 mm, breadth of prothorax 0,68 mm, breadth of abdomen 1,29 mm.

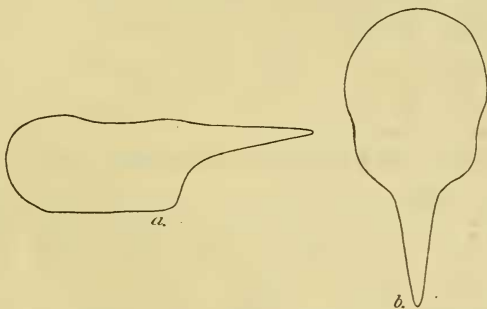
An interesting species undoubtedly belonging to HOLMGREN'S subgenus *Trinervitermes* and the first Australian repre-

representative of that group, which according to HOLMGREN is represented by 16 African and 3 Indian species. My specimens were taken under a stone at Cedar Creek (March). It does not seem to enter the jungles, but lives in the open Eucalyptus forest.

I take the liberty of naming this species after my good Australian friend, Dr. K. PULLEINE in Adelaide, who during so many years has been such a devoted collector and worker on the Australian insects and spiders.

27. *Eutermes Tyriei* n. sp.

Soldier (Text Fig. 29). Whitish yellow, unusually strongly hairy. — Head large, broad and rounded behind, strongly



Text Fig. 29. Shape of soldier of *Eutermes Tyriei* Mjöb. n. sp.
a from the side, *b* from above.

constricted in front behind the antennæ (see Text Fig. 29 b) with erect, long and stiff hairs; concerning the profile see Text Fig. 29 a; snout shorter than the other part of the head, broad at the base, tapering strongly to the tip; palpi yellowish with very long and slender joints; antennæ 14-jointed, long and slender, fuscous joints, lighter at the base and the tip, basal joint broad and stout, 2rd much shorter and not so broad, a little more than half so long as the 1st, 3rd very long and slender more than twice, nearly thrice as long as broad, 4th and following five joints slightly longer and more slender, the 10th and following becoming slightly shorter and shorter, apical joint the shortest, about twice as long as broad, elongate, rounded at tip; prothorax saddle-shaped, ridged in front and darkly fuscous coloured, with lighter median line

and long and stiff hairs on top of the ridge and at the sides; meso- and metathorax not quite so broad, with yellowish chitinous cross-bands; legs very long and slender, strongly hairy; tibiæ much longer than tighs, claws long and sharp; abdomen elongate, rounded, dorsal chitinous plates light yellow with two rows of long, stiff, erect hairs.

Measurements: Length of body 3,6 mm, length of head 1,56 mm, length of snout 0,65 mm, breadth of snout at base 0,21 mm, breadth of head 0,65 mm, length of prothorax 0,25 mm, breadth of prothorax 0,46 mm, breadth of abdomen 0,86 mm.

Worker. Whitish with darker head,

Head on the upper surface broadly blotched with reddish-brown, divided by a broad median and a broader transversal whitish line into two broad posterior and one transversal bandlike anterior part; clypeus whitish, broad and rounded, divided by a median suture, apical part much smaller, rounded at tip, labrum broad convex, rounded in front; jaws large and broad, the left one with two apical teeth, a third one near the base and an obtuse protruding angular process, the right one with two apical and one median obtuse tooth; antennæ 15-jointed, whitish, basal joint large and stout, 2nd only half so broad and half so long, 3rd more rounded, slightly longer, 4th and 5th of similar shape, 5th slightly shorter, 6th and following joints not so rounded at the sides, tapering to the base, gradually longer and longer, the 14th the longest, being twice as long as broad, apical joint elongate rounded at the tip; prothorax ridged in front, hairy; meso- and metathorax not so broad, light yellowish; legs comparatively short; abdomen whitish, thickly hairy, broad and rounded.

Measurements: Length of body 4,30 mm, length of head 1,62 mm, breadth of head 1,39 mm, length of prothorax 0,25 mm, breadth of prothorax 0,80 mm, breadth of abdomen 1,60 mm.

A very characteristic species, easily distinguished from all other Australian species by the shape of the head of the soldier and the structure of the antennæ. It is the only large-sized Australian species with the head constricted in front. As in *E. magnus* FROGG. the whole body is provided with very long and stiff hairs.

The species was found in the vicinity of Laura in the Cape York Peninsula, in the open sun-bathed savannah forest country. It builds very typical, flat and broad nests of the shape and form as shown by Plate 3, Fig. 1. It consists of a very hard and about up to two inches thick earthy and sandy substance as cover or coating and of rounded ducts and galleries formed of a darker and more fragile apparently partly wooden substance. It attains a height of up to one meter and is about one meter in diameter at the base. A nest of that size which I managed to bring home to Sweden and which now is in the State Museum in Stockholm had a weight of more than 500 kilogram in fresh condition.

The top galleries, i. e. the hottest parts during the day, of the nest of this species are to a great extent used as cemeteries, a question which will be dealt with in a later chapter.

28. *Eutermes ocellaris* n. sp.

Imago (Text Figs. 20 a, 30, 31). Upper side fuscous-castaneous, underside light yellow-whitish.

Head vertical, broad, rounded behind, deeply emarginate in front; eyes very large, rounded, projecting at the sides; enormously large, convex, obliquely placed quite near the inner margin of the eyes, whitish; fontanelle in the shape of a light yellow median streak, basal part of clypeus more than twice as broad as long, light yellow, rounded at the sides and at the anterior margin, straight in front, divided by a light median suture; apical part whitish, rounded, prolonged



Text Fig. 30. Right jaw of imago of *Eutermes ocellaris* MJÖB. n. sp.

in the centre; labrum broad, rounded; jaws large, the left one with a very long and sharp apical tooth, a second more obtuse and shorter tooth a little above the middle and a broader projecting basal portion; the right one with the basal portion broader and not so strongly projecting; antennæ 16-jointed very long and slender, light yellow, basal joint much longer and broader than 2nd, 3rd very short, shorter than

2nd and 4th, 5th slightly longer than 2nd, 6th and 7th of about the same length as 5th, the 8th and following gradually becoming longer and longer, joints 13—16 twice as long as broad, top-joint rounded at tip; prothorax very broad, dark fuscous, sides, a very fine median line and a little rounded spot on each side of the median line a little behind the anterior margin lighter coloured, provided with very long hairs at the margins; anterior margin slightly emarginate, anterior angles broadly rounded, sides strongly tapering to the base, sides and hind margin nearly forming a half-circle, meso- and metathorax more flattened, partly lighter coloured; wings broad and rounded, the two stout nervures at the front-margin joining at the tip, mediana running through the upper part of the wing, sending out an un-forked branch already near the middle, cubitus with 6—8 very stout oblique nervures; in the hind-wing mediana seems to run unbranched out to the tip; cubitus sends out up to 10 oblique very stout nervures, the whole venation, however, is here as in most of the members of the family *Metatermitidæ* subject to great variations, legs moderate, thighs fairly stout; abdomen broad, rounded, with 9 broad dark fuscous chitinous dorsal plates; cerci stout.



Text Fig. 31.
Antenna of
imago of
Eutermes
ocellaris
MjÖB. n. sp.

Measurements: Length of body with wings 10 mm, length of body without wings 5,2 mm, length of head 0,97 mm, breadth of head 1,03 mm, length of prothorax 0,57 mm, breadth of prothorax 1 mm, length of fore wing 8,1 mm, breadth of fore wing 2,4 mm, length of hind wing 7,4 mm, breadth of hind wing 2,7 mm, breadth of abdomen 1,37 mm.

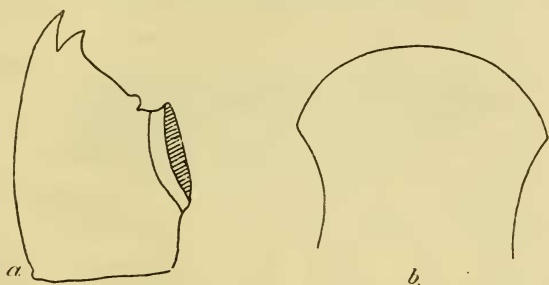
A very characteristic species, allied to *E. tumuli* FROGG., but much smaller in size and lighter coloured; it has a similar prothorax in shape but much smaller in size; it has the largest ocelli (0,19 mm) of all Australian species; in general it is much more lighter coloured than *E. tumuli* FROGG.

Three winged specimens taken at light during the night near Oscar Range in the Kimberley-district of Northwest-Australia (²¹/₁).

29. *Eutermes magnificus* n. sp.

Imago (Text Figs. 32, 33, 34). A large-sized, beautiful species with dark castaneous head and brown wings.

Head very large, broad and rounded, flattened on the summit, with scattered hairs; eyes moderate, fairly projecting; ocelli large, oval, the distance from the inner margin of the eyes about as long as the length of the ocelli; the fontanelle elongate, broadest behind; basal part of clypeus lighter coloured with smaller rounded yellow spots, very much broader than long, rounded on the sides and at the anterior angles, truncate in front, divided by a median suture; apical part membranaceous, whitish, rounded (slightly damaged on



Text Fig. 32. *a* Left jaw of imago of *Eutermes magnificus* MjÖB. n. sp.
b Tip of labrum of " " " " " " " " " " " "

the specimen in question), probably deeply excised in the middle; labrum very large and broad, swelling out greatly towards the tip, with a lighter, more transparent border at tip, hairy; jaws very stout, the left with two strong apical teeth and a sharp edge running down above the middle and rounded at the end, basal portion hatchet-shaped, projecting and rounded at the tip, the right with two much longer, stouter and sharper apical teeth, a more obtuse one in the middle and a non-projecting basal portion; antennæ 18-jointed, light fuscous, basal joint very long and broad, nearly twice as long as the 2nd, 3rd only about half so long as 2nd, partly coalescing with 4th which is still shorter, 5th of about the same length as 3rd, 6th and following gradually longer, 15th to 18th twice as long as broad, apical joint the longest, sharply pointed at

the tip; prothorax nearly as broad as the head, truncate in front, broadly rounded at the anterior angles, tapering on the sides to the rounded hind angles, very slightly emarginate at the hind, slightly turned up at the front margin, dark castaneous, thickly hairy; meso- and metathorax light fuscous in the middle; wings very long and broad, light ferrugineous with darker nervures, forewings not quite so broad as the hindwings and slightly shorter, the second nervure at the front margin very stout and more darkly coloured, diffusely clouded with yellowish below, hairy, joining with the first



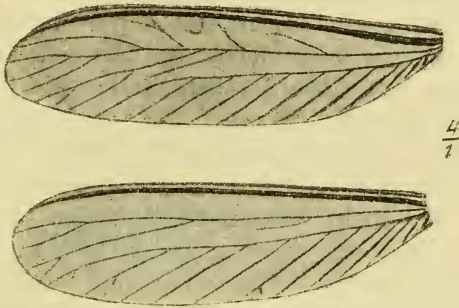
Text Fig. 33.
Antenna of
imago of
*Eutermes
magnificus*
MjöB. n. sp.

nervure at the tip, and there forming a little yellow spot or »wing-mark»; mediana running through the upper part of the-wing sending out three or four branches into the space between mediana and the second stout nervure, which run up to this nervure; near the middle there is also a stouter nervure running out from the second stout nervure, turning sharply towards the tip and ending freely; to the rear mediana sends out two or three mostly forked nervures; cubitus with about 11 unforked oblique nervures; in the two hindwings the venation is slightly different; in the left one mediana runs very highly in the wing and sends out no anterior branches, but gives off a freely ending posterior branch already some distance before the middle, and another unforked one further out nearer the tip, in the right one mediana sends out four fairly well marked nervures in the direction of the second stout nervure of the anterior margin, which usually end freely into the membrane; there are also two straight unforked nervures running out from mediana between the middle and the tip of the wing; cubitus of both hindwings sends out 11 oblique straight mostly unforked nervures to the hind-margin; legs light brown; abdomen with 9 broad chitinous dorsal plates and with two rows of light brown spots on the ventral side; cerci short.

Measurements: Length of body with wings 18,5 mm, length of body without wings 10 mm, length of head 1,62 mm, breadth of head 1,8 mm, length of prothorax 0,95 mm, breadth of prothorax 1,67 mm, length of forewing 20 mm,

breadth of fore wing 4,2 mm, length of hindwing 19,5 mm, breadth of hind wing 4,5 mm, breadth of abdomen 2,4 mm.

A very characteristic and beautiful species, which in size comes nearest to *E. magnus* FROGG. and *E. nigerrimus* MJÖB. It differs from all other Australian species, of this genus by having 18-jointed antennæ (in the species mentioned only 16-jointed antennæ). Its broad prothorax and very long wings with the very complicated venation give it a distinguished place among all *Eutermes* species of the Australian region.



Text Fig. 34. Wings of *Eutermes magnificus* MJÖB. n. sp.

A single specimen taken in the air, swarming after a heavy rain at Lower Lewarynga in the Kimberley district of North-West Australia in December.

30. *Eutermes* sp.

Two winged specimens, taken swarming in the air after a rain in the Kimberley district of Northwest Australia (December). As they belong to no very characteristic species, I have preferred not to describe them as a new one, though they apparently are not identical with any previously described Australian *Eutermes* imago. The body measures with wings 13 mm, the antennæ are 16-jointed and prothorax slightly emarginate at the hind margin. The wings show the ordinary *Eutermes* venation.

Genus *Hamitermes* SILV.

HOLMGREN in his »Termitenstudien» III, p. 88—89 (1912), has divided this genus in six different subgenera, three of which are represented in Australia (*Drepanotermes*, *Monodontermes* and *Hamitermes* s. str.) in seven different species. As a matter of fact, the subgenus *Drepanotermes* includes the two peculiar forms. *Dr. perniger* FROGG. and *Dr. rubriceps* FROGG. seems me to be so well separated from the other sub-genera that it probably deserves the rank of a good genus.

Of the sub-genus *Hamitermes* s. str. hitherto only two species were known from the Australian continent: *H. meridionalis* FROGG. from the northern and central parts and *H. obeuntis* SILV. from S. W. Australia. In studying my large material from nearly all parts of the wide continent I find that it is richly represented by quite a number of new species. Most of them belong to the open savannah forest country (6), only one having specialized for a life in the rain-forests or jungles. The separating characters are the number of joints of antennæ, the shape and dentition of the jaws and the shape of the head. Also the shape and form of the nest are very variable, in spite of the species being morphologically really closely related. As those differences are quite constant, I think I am justified in describing them as distinct species.

The wing nervures of the imago are subject to very great variations. Sometimes mediana and cubitus send out a great number of nervures backwards and forwards, sometimes only few.

The soldiers of the 14 hitherto known distinct species can be separated by the second Key. The imagines of the five hitherto know species are tabulated in the following key.

Key

to the five hitherto known imagines of the Australian
Hamitermes-species.

- I. Antennæ with 17 (18) joints 1.
E. perniger FROGG.

- II. Antennæ with 16 joints 2.
H. kimberleyensis MJÖB.
- III. Antennæ with 15 joints.
- A. Fontanelle very large and rounded 3.
H. herbertensis MJÖB.
 (Text Fig. 37 b.)
- B. Fontanelle of normal size, elongate.
- a. 13th and 14th joints of antennæ twice as long as broad, fontanelle broader and more rounded at the sides 4.
H. lativentris MJÖB.
- b. 13th and 14th joints of antennæ not twice as long as broad; fontanelle more narrow, not so rounded at the sides . . . 5.
H. obtusidens MJÖB.

Key

to the Australian species of the genus *Hamitermes* based upon the characters of the soldiers.

- I. Antennæ 17- (18)-jointed, body large, legs very long (subg. *Depranotermes* SILV.) (Text Fig. 35 a).
- A. Jaws very long with very broad and projecting tooth (Textfig. 39 c). 1.
H. perniger FROGG.
 Distribution: C, W. and N. Australia.
- B. Jaws shorter with triangular tooth 2.
H. rubriceps FROGG.
 Distribution: C. Australia.
- II. Antennæ 15-jointed.
- A. Tooth of jaws sharp, pointing forwards (subg. *Monodonotermes* SILV.).
1. Jaws long and sharp, tooth very long and sharp.
- a. Apical half of jaw not bent knee-like above tooth, which is situated nearer the apex than the base 3.
H. Hartmeyer SILV.
 Distribution: S. W. Australia.
 (SILVESTRI, l. c., Tab. XX, Fig. 147—153.)
- b. Apical half of jaw knee-like bent above tooth, which is situated nearer the base than the apex 4.
H. perarmatus SILV.
 Distribution: S. W. Australia.
 (SILVESTRI, l. c., Tab. XIX, Fig. 143—146.)
2. Jaws short and stout, tooth broad and triangular 5.
H. heierognathus SILV.
 Distribution: S. W. Australia.
 (SILVESTRI, l. c., Tab. XX, Fig. 15, 7.)

- B. Tooth of jaws either pointing sharply backwards or straight inwards or jaws broad and strongly bent at tip with a deep rounded incision at the middle of the anterior margin (subg. *Hamitermes* s. str.).
1. Tooth of jaws mostly sharp, pointing backwards.
Tooth of jaws not very long. 3rd joint of antennæ coalescing together with the 4th.
* Head larger, tooth of jaws sharp (Text Fig. 37 a) 6.
H. meridionalis FROGG.
Distribution: N., E., S. Australia.
 - ** Head smaller, tooth of jaws not sharp (Text Fig. 38 b) . 7
H. laurensis MjÖB.
Distribution: N. Queensland.
 - b. Tooth of jaws very long and very sharp. 3rd joint of antennæ free 8.
H. Kimberleyensis MjÖB.
Distribution: N. W. Australia.
(Text Fig. 38 a).
 2. Tooth of jaws directed straight inwards.
 - a. Body large, head very large and convex, jaws long and curved with large triangular tooth 9.
H. herbertensis MjÖB.
Distribution: N. Queensland.
(Text Fig. 36 c.)
 - b. Body small head small, jaws short with either a slight incision or an obtuse rectangular tooth.
*. Jaws with only a slight incision, head with more parallel sides, 3rd joint of antennæ coalescing with 4th . . 10.
H. scopulus MjÖB.
Distribution: N. Queensland.
(Text Fig. 42 b.)
 - ** Jaws with a projecting, obtuse, more or less rectangular tooth 11.
H. obtusidens MjÖB.
Distribution: S. Queensland.
(Text Fig. 42 a.)
 3. Jaws very broad, strongly bent at the tip with a deep rounded incision.
 - a. 3rd joint of antennæ coalescing together with 4th; labrum broad, not tapering on the sides to the top 12.
H. obeuntis SILV.
Distribution: S. W. Australia.
(SILVESTRI, l. c., Taf. XX, Fig. 167—168.)
 - b. 3rd joint of antennæ quite free, labrum not so broad, very much tapering to the tip, abdomen very broad 13.
H. lativentris MjÖB.
Distribution: S. Queensland.
(Text Fig. 39 d.)

III. Antennæ 14-jointed, jaws very short and stout with large triangular tooth 14.

H. latidens MJÖB.

Distribution: N. Queensland.

(Text Fig. 43 a, 44.)

31. *Hamitermes* (*Drepanotermes*) *perniger* FROGG.

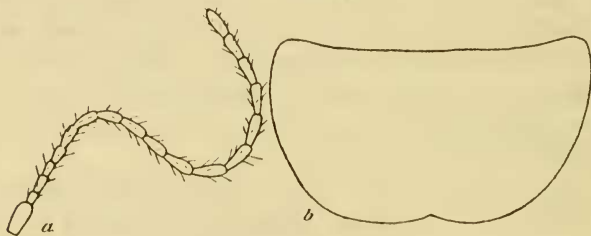
The soldiers of this very curious form seem to vary to a very great extent. Some, if not most, of the specimens from North Australia have the head much lighter coloured (light reddish brown), the hind head broader and more convex than in the ordinary dark-headed type. The shape and size of the head also seems to be subject to great variations. I have examined a large material from various localities but without being able to find any constant characters justifying me in creating a new species for the light-headed ones from Kimberley and Northern Queensland. Between the extreme types there is a whole series of intermediate forms. Under these circumstances I have preferred not to give a special name to the variety just mentioned.

As the winged insect and the nest and habits of this species as well of the allied species *E. rubriceps* FROGG. are hitherto unknown, I append description.

Imago (Plate 1, Fig. 1, Text Figs. 35 b, 36 a, b). Light reddish-brown, with long, light ferruginous—reddish wings; eyes black.

Head vertical, rounded behind, flattened on the summit, with a deep median streak-like impression in the front («die Fontanelle»); eyes comparatively small, rounded, very little projecting; ocelli oblique, whitish, situated a good bit away from the innermargin of the eye, oval, about twice as long as broad; front deeply emarginate, providing space for the basal part of clypeus, which is distinctly divided by a median darker suture, slightly emarginate in front, hairy; apical part of clypeus whitish, membranaceous, straight on the sides, but tapering to the front margin, which is strongly produced in the middle to an obtuse lobe; labrum narrow at the base, much broader and rounded towards the tip; jaws very broad and stout, triangular, the inner margin dark fuscous, the dentition very similar to that of the genus *Eutermes*, the left jaw with two sharp apical teeth, then a

sharp ridge and a basal angular indentation, the right one with two large apical teeth and a smaller, more obtuse one further below, at the base another still smaller and more obtuse tooth; antennæ 17-jointed, basal joint very long and stout, 2nd not so broad and only slightly more than half so long, 3rd and 4th very short of about the same length, the 3rd only slightly broader, 5th also short, but slightly longer than the 4th, 6th to 9th gradually longer, 10th to 17th of very nearly the same length, hardly twice as long as broad, the three apical joints not quite so broad as the preceding ones, apical joint very narrow at the tip; palpi very long and stout, apical joint not quite so broad as the preceding joint at the tip; prothorax very broad, though not so broad as the head, emarginate in front, with a deep



Text Fig. 35. a Antenna of soldier of *Hamitermes perniger* FROGG. from Dukes Dôme in N. W. Australia.

b Prothorax of imago of *Hamitermes perniger* FROGG.

curved transversal impression behind the front margin, which is distinctly raised up, with a median impressed line limited backwards by a transversal impression just before the hind margin; anterior angles rounded, sides tapering sharply backwards, in the centre of the hind margin a fairly deep excision, the whole upper surface covered with thick hairs; meso- and metathorax with darker median line; wings very long and broad, rounded at the tips, hind wing broader but shorter than the forewing, light reddish ferrugineous, anterior, two stout nervures running parallel out to the beginning of the rounded tip, the second one broadly lined below with reddish yellow; mediana of the fore wing running through the upper part of the wing, sending out a varying number of nervures to the tip and the hind border, generally four but sometimes more, all forked at the tip or the 3rd unforked,

or only the apical one forked; cubitus sending out as a rule 8 oblique nervures of which most are forked at tip; in the broader hind wing mediana runs still higher up above the middle of the wing and sends out a couple of unforked nervures in the direction of the second stout nervure of the front margin which, however, end freely in the membrane; these nervures branch off before the long oblique nervure, which reaches the hind margin; cubitus forked at tip, sending out about 8 oblique nervures, of which three or four are forked before they reach the posterior margin; legs comparatively short and stout, hairy, tibiae with two sharp apical spines, claws long and sharp; abdomen broad, thickly hairy, broadly rounded at tip; cerci short.

Measurements: Length of body with wings 16,5 mm, length of body without wings 10 mm, length of head 2,28 mm,



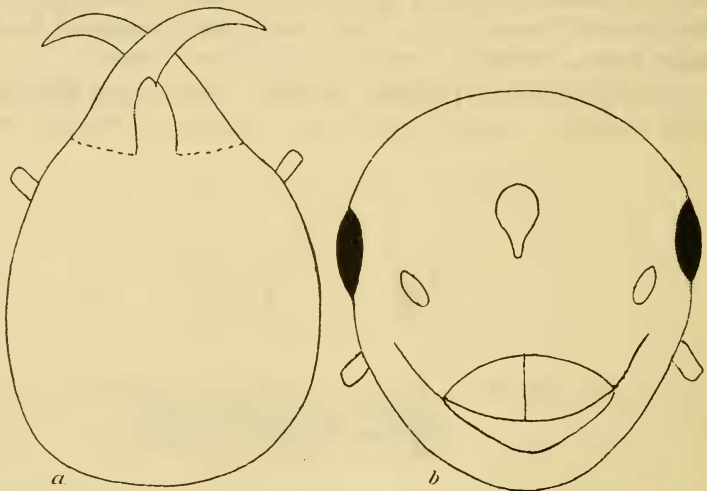
Text Fig. 36. a, b Left and right jaws of imago of
Hamitermes perniger FROGG.
c Left jaw of soldier of *Hamitermes*
herbertensis MJÖB. n. sp.

breadth of head 1,82 mm, length of prothorax 1 mm, breadth of prothorax 1,67 mm, length of fore wing 13,4 mm, breadth of forewing 3,5 mm, length of hindwing 12,8 mm, breadth of hindwing 3,8 mm, breadth of abdomen 2,5 mm.

This termite lives in the driest and hottest parts of the continent. Previously it was only known from the desert-like country round Kalgoorlie in West Australia, but is apparently spread over the whole North Australia. My material contains specimens from many places in N. W. Australia as Broome (winged ones in June), Derby, Lower Levarynga, Noonkanbah, St. George Range, as well as from the Cape York Peninsula from Laura and Coleman River.

The species lives in a very inconspicuous way. It is an underground termite which builds its nest deeply down in the ground, the only visible part of the nest being a flattened

reddish roof which lies on very nearly the same level as the ground. In my diary I find the following field notes: »It is about one meter in diameter and is raised very slightly above the surroundings, being highest in the centre. The cover consists of a very hard and very dense substance of reddish colour, the other parts of the nest also of reddish material, but slightly softer, the deeper down one goes. Immediately under the hard cover the galleries commence. They were, in the nest in question, all filled up with short yellow and dry pieces of grass and roots, which material apparently



Text Fig. 37. *a* Head of soldier of *Hamitermes meridionalis* FROGG.
b Head of imago of » *herbertensis* MJÖB. n. sp.

was brought up to the top of the nest to be dried up so completely and quickly as possible in order to prevent deadly diseases breaking out (see following chapter). Here the first soldiers were met with. They appeared in very great number and defended themselves furiously against the intruder; here and there they were seen in the more narrow duct and openings of the galleries nearly filling out the opening with their heads and snapping and biting with their long and sharp mandibles viciously. Also the workers were attacking my fingers and biting with their jaws. The soldiers were actually digging in their sharp jaws so deeply that the blood was oozing out.

The galleries grow wider and wider the deeper one gets. Most of them were filled with dry yellow pieces of grass. They go down to a depth of about half a meter in the centre, but are not so deeply placed towards the periphery. In the most deeply situated galleries (see Text Fig. 58 b) the winged insects were found in large number. They were very quick in their movements and took to their wings for smaller distances. Here also some whitish specimens with wing-cases were found.»

Also in the vicinity of Laura in North Queensland I saw the same flattened nests inhabited by the same species. In one nest I found millions of eggs, but no trace of any queens. The eggs are very small, of oval shape.

Near Alice River in North Queensland this species sometimes occupies the nest or parts of the nests of *Coptotermes lacteus* FROGG.

32. *Hamitermes meridionalis* FROGG.

(Text Fig. 37 a.)

This species so well-known on account of its very peculiar nests, the so called »magnetic nests» is commonly met with in eastern Australia. In the vicinity of Laura in Cape York Peninsula it builds very high greyish nests in the open savannah country, but as a rule on slightly damp ground. It is also known from the southern parts of Queensland and from New South Wales, but does not seem to construct similar nests in those parts. It is spread also over the eastern desert-like parts of West-Australia and in Central Australia.

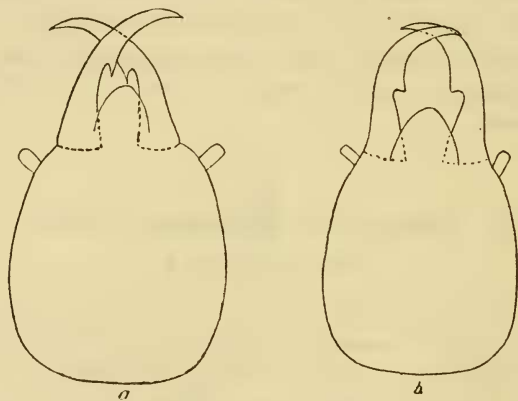
My material contains specimens from Laura and Coleman River in the Cape York Peninsula and from Adelaide in South Australia. It occupies sometimes the nest of *Coptotermes lacteus* FROGG, and in one instance I have found it completely inhabit the small conical nest of *H. laurensis* MJÖB.

All the soldiers examined by me have a very distinct sharp backwards pointing tooth on the jaw. This is also the case with specimens determined by FROGGATT which I have had to my disposal. The very closely allied species *H. laurensis* MJÖB. never shows that shape of the tooth, but is invariably more obtuse.

As regards the nest of this species the reader is referred to a following chapter on the nests.

33. *Hamitermes laurensis* n. sp.

Soldier (Text Fig. 38 b). Closely allied to *H. meridionalis* FROGG. but quite distinct by the smaller, shorter and more light yellowish head, which is less rounded at the hind margin and comparatively broader behind with the sides slightly more tapering to the front, jaws shorter and stouter with the tooth more obtuse (see Text Fig. 38 b), labrum slightly



Text Fig. 38. a Head of soldier of *Hamitermes kimberleyensis* MjÖB. n. sp.
b » » » » » » *laurensis* MjÖB. n. sp.

smaller and not quite so broad, 3rd joint of antennæ strongly coalescing with 4th, very short.

Measurements: Length of body with jaws 4,7 mm, length of head with jaws 1,84 mm, length of head without jaws (to tip of labrum) 1,5 mm, breadth of head 1,08 mm, length of prothorax 0,32 mm, breadth of prothorax 0,67 mm, breadth of abdomen 1,33 mm.

Worker. As in *H. meridionalis* FROGG., but of smaller dimensions; antennæ 15-jointed.

Measurements: Length of body 4,3 mm, length of head 1,12 mm, breadth of head 1 mm, length of prothorax 0,29 mm, breadth of prothorax 0,65 mm, breadth of abdomen 1,39 mm.

In the nest of this species there are as a rule up to 20 or 30 neotenic queens.

Neotenic queen. Whitish with 8 light brown dorsal plates.

Head rounded with black, rounded but not projecting eyes, antennæ 15-jointed, 3rd joint very short, coalescing with the 4th; prothorax thickly covered with long hairs, broad and short, emarginate in the middle of the hind margin.

Measurements: Length of body 10 mm, length of head 1,14 mm, breadth of head 1,10 mm, length of prothorax 0,42 mm, breadth of prothorax 0,89 mm, breadth of abdomen 3 mm.

The species builds a nest (Text Fig. 64) of quite another type than that one of *H. meridionalis* FROGG. It grows to a height of about half a meter and about a quarter of a meter in diameter and consists of a greyish-yellowish hard cover of some centimeters in thickness. In the interior parts are the darker galleries. The whole top of the nest is reserved as a buryingplace for the dead (see the last Chapter on the nests). It is built on dry and open grassy ground and often covered over by the very long grass.

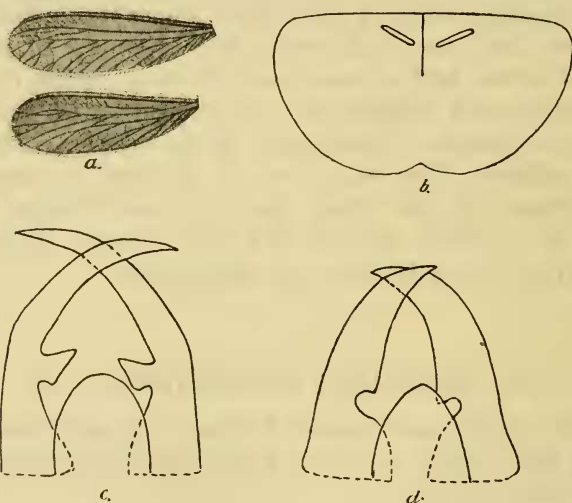
34. *Hamitermes kimberleyensis* n. sp.

Allied to *H. meridionalis* FROGG., but quite distinct by its very long, sharp and very much backward reaching tooth of the jaws.

Imago (Text Figs. 39 b, 40 a). Head, prothorax and chitinous plates of abdomen dark greyish brown, under-surface and legs whitish yellow, except two rows of darker spots of abdomen. Wing greyish brown.

Head comparatively large and broad, rounded, broadest near the eyes with light median line behind; basal part of clypeus light brown, divided by a dark median suture in two lobes, truncate in front, convex, apical part whitish, produced in the middle at the front margin, labrum long, broad and convex, rounded at the tip; jaws large and broad, the left one with two large and sharp apical teeth and a large obtuse basal process, the right one with two large and sharp apical and two smaller and more obtuse basal teeth, interior margin dark fuscous; antennæ 16-jointed, dark brown, fairly long and slender, 2nd joint only half so long and half

so broad as the 1st, 3rd very short, the shortest of all and also the most narrow one, only a third part in length of the 2nd, 4th broader and distinctly longer, 5th to 7th about as long as broad, 8—15 gradually longer and longer, 14th and 15th twice as long as broad, 16th slightly longer, pointed, eyes fairly large and projecting, ocelli narrow, oval, but pointed in front, oblique situated far away from the eyes, fontanelle like the ocelli in shape, only slightly smaller; prothorax not so broad as the head, but about twice as broad

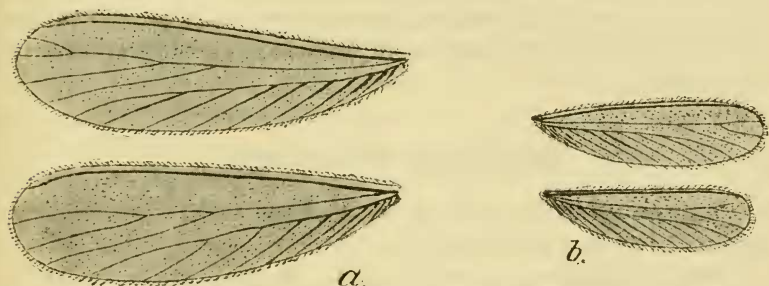


Text Fig. 39. a Wings of *Hamitermes herbertensis* MjÖB. n. sp.
 b Prothorax of imago of *Hamitermes kimberleyensis* MjÖB. n. sp.
 c Jaws and labrum of soldier of *H. perniger* FROGG. fr. Cape York Peninsula.
 d » » » » » » » » *lativentris* MjÖB. n. sp.

as long, slightly emarginate in front, with a light median line in the anterior half part and a broader whitish curved cross-line with numerous small whitish rounded spots, thickly hairy, tapering strongly to the rounded hind angles, fairly deeply excavated at the hind margin; wings long, more than three times as long as broad, the second nervure very strong and stout, lined with light yellow below, running out to the beginning of the rounded tip; mediana running through the upper part of the wing, forked at tip and sending out already about at the middle one to three usually unforked nervures

to the tip, cubitus running close to mediana, sending out 9—10 oblique often forked nervures to the hind margin; in the hind wing mediana sends out two to three oblique forked or unforked nervures, to the tip, the first one branching off already near the middle, cubitus about 8 oblique ones to the hind border; legs comparatively short and stout, thighs broad, tibiæ with two sharp apical spines, abdomen long with parallel sides; cerci light yellow; basal joint very broad.

Measurements: Length of body with wings 13,5 mm, length of body without wings 7,5 mm, length of head 1,52 mm, breadth of head 1,25 mm, length of prothorax 0,63 mm, breadth of prothorax 1,12 mm, length of forewing 11,6 mm, breadth of forewing 3 mm, length of hindwing 11,2 mm, breadth of hindwing 3,1 mm, breadth of abdomen 2 mm.



Text Fig. 40. *a* Wings of *Hamitermes kimberleyensis* MJÖB. n. sp.
b Wings of *Hamitermes obtusidens* MJÖB. n. sp.

Soldier (Text Fig. 38 a). Head of about the same shape as *H. meridionalis* FROGG., but lighter yellowish, rounded at the sides, slightly constricted at the sides near the root of the antennæ; labrum long, rounded at the sides and at the tip; jaws much longer and much slender, very broad at the base, with a very long and very sharp hook-like, backward directed tooth; antennæ 15-jointed, much longer and slender than in *H. meridionalis* FROGG., basal joint long and stout, more than twice as long as the 2nd, 4th and 5th thicker, slightly longer, 6th still slightly longer, 7th to 14th about 2½ as long as broad; palpi very long and slender, but not reaching to the tip of jaws.

Measurements: Length of body with jaws 5 mm, length of head with jaws 2,15 mm, length of head without

jaws 1,63 mm, breadth of head 1,22 mm, length of prothorax 0,34 mm, breadth of prothorax 0,82 mm, breadth of abdomen 1,46 mm.

Worker. As in *H. meridionalis* FROGG., but much lighter, whitish yellow.

Measurements: Length of body 5,2 mm, length of head 1,48 mm, breadth of head 1,22 mm, length of prothorax 0,46 mm, breadth of prothorax 0,78 mm, breadth of abdomen 1,52 mm.

This species lives in the Kimberley-District in North West Australia. It does not seem to construct nests, but lives in the large nests of *Eutermes nigerrimus* MJÖB. and of other species. In opening a large nest of the former species I found quite a number of winged insects (only one soldier) streaming out, taking to their wings together with the imagines of a very small *Microcerotermes* species. — Specimens from Derby (under horse-dung) and Noonkanbah (160 miles from the coast).

35. *Hamitermes herbertensis* n. sp.

Imago (Text Fig. 37 b, 39 a). A characteristic large-headed species from the rainforests.

Head slightly longer than in *H. kimberleyensis* MJÖB., eyes longer and slightly more projecting, rounded behind, dark fuscous-brown with numerous yellow rounded small spots, ocelli of oval shape, oblique, situated in front of the eyes; basal part of clypeus light brown, divided by a dark median suture, rounded and tapering on the sides, truncate in front; apical part whitish, produced in front; labrum large, convex, rounded in front; jaws comparatively small, the left one with two sharp apical teeth, the second one continuing into a sharp ridge further down, basal portion angular, obtuse, the right one with two very large and sharp angular teeth and a very much smaller median one, basal part obtuse; fontanelle very large, whitish, rounded and continuing forwards in two light, curved lines; antennæ 15-jointed, light fuscous, basal joint more than twice as long as the 2nd, 3rd only half so long as 2nd, 4th broader than 3rd, 4th to 6th rounded, about as broad as long, 7th to 15th about $1\frac{1}{2}$ so long as broad; prothorax much broader than long, trun-

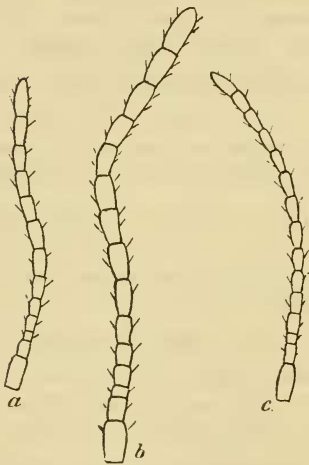
cate in front, thickly hairy, with numerous small yellow rounded spot and a light median line on the anterior half part and a broad, curved yellowish cross-band, tapering strongly to the base, excised in the middle of the hind margin; wings greyish-brown, long, rounded at tip, the nervature very curious and variable; the two stout nervures running out to the tip, between them at the tip many small cross nervures (6—8), also below the second very stout nervure there are on the exterior half of the wing numerous oblique irregular veinlets running out into the membrana and ending freely; mediana runs very high up in the wing, giving off, as a rule, at a distance of about two third parts of its length from the base, three long simple or forked branches, but in an other case (see Text Fig. 39 a) only one, which joins a branch of cubitus; also in the spaces between the branches of cubitus there are some irregular veinlets; cubitus is richly developed, with about 8—12 oblique branches to the hind margin; also the venation of the hind wing is very variable; mediana is richly developed and sends out a number of branches, which here and there are anastomotic with eachother; in the specimen figured (Text Fig. 39 a) there is an off-branch running out into the space between the second stout nervure and mediana, commencing already a bit away from the base; there is also an anastomosis between mediana and cubitus; in both the winged insects which I have at my disposal there is a remarkable irregularity in the venation of the wings, which I have never found in any other Australian termite; legs of moderate size; abdomen with parallel sides, with 9 chitinous dorsal plates.

Measurements: Length of body with wings 14,8 mm, length of body without wings 7 mm, length of head 1,52 mm, breadth of head 1,33 mm, length of prothorax 0,68 mm, breadth of prothorax 1,14 mm, length of forewing 13,2 mm, breadth of forewing 3 mm, length of hindwing 12 mm, breadth of hindwing 3,5 mm, breadth of abdomen 1,2 mm.

Soldier (Text Figs. 36 c, 41 c). Easily recognizable by its bright reddish-yellow, very high, convex and large head, the long jaws, provided with a strong but not sharp median tooth and the fairly long and slender-jointed antennæ with the 3rd and 4th joint coalescing.

Head large, convex and rounded behind, sloping down

in the front, lighter coloured on a broad patch on the summit; of clypeus there is only a short and fairly narrow part visible, which is rounded at the anterior angles and softly emarginate in front, with four stiff erect hairs, in the middle a bit behind from the margin; labrum small, rounded at the tip and at the sides, hairy; jaws very long and stout, curved, with large basal part and a large but more or less obtuse tooth about in the middle; antennæ 15-jointed, light yellow, basal joint twice as long and twice as broad as the 2nd, 3rd and 4th more or less completely coalescing together to a double joint, which is only slightly longer than the 2nd, 5th joint smaller, 6th slightly longer, 7th to 14th longer than broad, narrow at the base, much broader at the tip, apical joint rounded, slender, slightly pointed; prothorax ridged in front, hairy, with a reddish yellow cross-band, meso- and metathorax slightly broader legs stout, hairy; abdomen quite pellucid, allowing the dark content of the intestines to shine through.



Text Fig. 41.

- a* Antenna of soldier of *Ahamitermes nidicola* MjÖB. n. sp.
b Antenna of soldier of *Hamitermes lativentris* MjÖB. n. sp.
c Antenna of *Hamitermes herbertensis* MjÖB. n. sp.

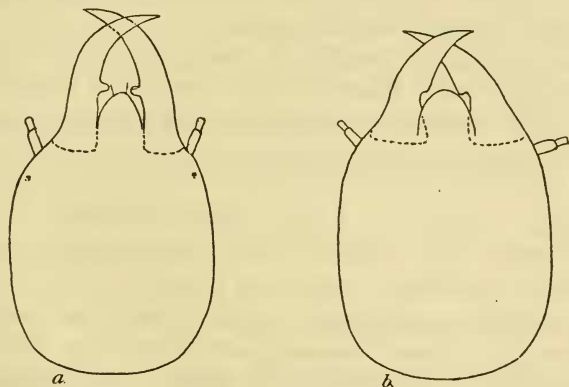
Measurements: Length of body with jaws (opened) 6 mm, length of head 2,5 mm, length of head without jaws 1,81 mm, breadth of head 1,43 mm, length of prothorax 0,32 mm, breadth of prothorax 1 mm, breadth of abdomen 1,62 mm.

Worker. Elongate, head light reddish-yellow, with lighter median line, rounded, broadest near the base of antennæ, whitish in front; clypeus large, whitish, swelled, rounded at tip; jaws large, triangular, the left one with two not very sharp teeth, the second one continuing into a sharp margin further down, basal part large, angular, the right one with two large and broad triangular teeth at the tip and a third very much smaller immediately below, basal portion not so angular as in the left one; antennæ 15-jointed, 3rd to 6th joints fairly stout, broader than long, 7th—15th gradually

longer and longer, 15th nearly twice as long as broad, tapering to the tip; prothorax raised to a ridge in front as in the soldier; legs short and stout; abdomen pellucid as in the soldier.

Measurements: Length of body 6 mm, length of head 1,73 mm, breadth of head 1,33 mm, length of prothorax 0,42 mm, breadth of prothorax 0,95 mm, breadth of abdomen 1,6 mm.

This species is easily separated from all other Australian *Hamitermes* species by the unusually large fontanelle in the imago, the very peculiar irregular venation of the wings and the reddish-yellow, convex head of the soldier with the long jaws armed with a distinct, obtuse tooth. It



Text Fig. 42. a Head of soldier of *Hamitermes obtusidens* Mjöv. n. sp.
 b " " " " " " " *scopulus* Mjöv. n. sp.

is, so far as we know, the only Australian *Hamitermes* species inhabiting the rain-forests or jungles. It does not seem to construct a regular nest, but lives under bark and under rotten logs on the ground. My specimens all come from the northern rain-forests at Cedar Creek, Atherton and Herberton. The winged insects were taken in March.

36. *Hamitermes scopulus* n. sp.

Soldier (Text Fig. 42 b). A smallish species with very small head and very short jaws.

Head much longer than broad, very nearly parallel on the sides, rounded behind, light yellow, with a more whitish

yellow median longitudinal patch; of clypeus there is only a little narrow and short part visible, which being emarginate in the middle of the anterior margin gives the impression of being bilobated, with two stiff erect hairs in the middle; labrum small, narrow at the base, swelling out to the tip; jaws very short, curved inwards, very broad at the base, with a very obtuse median tooth near the middle; antennæ light yellow, basal joint twice as long and twice as broad as the 2nd, 3rd very short, only a third part in length of the 2nd, and more or less completely coalescing with 4th, which is broader than 3rd and about half so long as 2nd, 5th slightly longer than 4th, 6th still a little longer, joints 7th—14th gradually longer, about $1\frac{1}{2}$ as long as broad, 15th the longest, tapering to both ends; palpi long and slender, much longer than the jaws.

Measurements: Length of body with jaws 4,1 mm, length of head with jaws 1,65 mm, length of head without jaws 1,44 mm, breadth of head 1,06 mm, length of prothorax 0,32 mm, breadth of prothorax 0,67 mm, breadth of abdomen 1,45 mm.

Worker. Whitish with light yellowish head.

Head with light median line, lighter in front, rounded behind and at the sides, contracted near the root of antennæ; clypeus rounded at the sides, swelled, its apical part small, produced at tip; labrum long and narrow, swelling out towards the tip, which is rounded and slightly emarginate; jaws small, the left with two apical strong teeth, a sharp ridge and an angular projecting indentation, the right with two large broad and lea-like apical teeth and a large rectangular one further below, antennæ 15-jointed, 3rd joint smallest, partly coalescing with 4th, 5th shorter than 4th; joints 6th—13th longer than broad, the three last joints the longest, 15th twice as long as broad, tapering on the sides to the tip; prothorax small, ridged in front, meso- and metathorax rounded at the sides; legs moderate; abdomen elongate, whitish.

Measurements: Length of body 4 mm, length of head 1,22 mm, breadth of head 1,06 mm, length of prothorax 0,32 mm, breadth of prothorax 0,72 mm, breadth of abdomen 1,39 mm.

Neotenic queen. Whitish, with light yellowish head, eyes flattened, rounded; antennæ 15-jointed as in the worker; prothorax with smaller darker spots here and there except on an area of the same shape as found in the yellowish markings on the prothorax of the imago (not described!), truncate in front, rounded at the hind margin, thickly hairy; abdomen with faint, light brown cross-plates.

Measurements: Length of body 10 mm, length of head 1,24 mm, breadth of head 0,99 mm, length of prothorax 0,51 mm, breadth of prothorax 0,95 mm, breadth of abdomen 2,50 mm.

A very distinct species, easily recognizable by the shape of the head and the very short and stout jaws with the obtuse median tooth.

The species builds a very characteristic nest of the shape as shown in Text Fig. 63. It attains a height of about one meter and a diameter at the base of about 30 centimeters, tapering very strongly to the tip, which is sharply pointed. It consists of a very fine, thin and brittle cover of a greyish substance and a more solid interior containing the galleries, which are of the usual type.

57. *Hamitermes obtusidens* n. sp.

Imago (Text Fig. 40 b). Head dark brown, prothorax, chitinous plates of abdomen and antennæ dark brown, underside with mouth-parts and legs light yellowish.

Head rounded, flattened on the summit, dark fuscous with numerous small yellow rounded spots, thickly hairy; eyes not very large, fairly projecting; ocelli large, yellow, oval, oblique; fontanelle yellow, oval, continuing forwards in a more narrow yellow line, which soon branches up into two diverging branches; basal part of clypeus light brown, divided by a darker median suture, rounded at the anterior angles, truncate in front, apical part whitish, produced in front; labrum swelling out to the tip, rounded at the sides; jaws large, triangular, the left with two very long and sharp apical teeth, the second continuing into a sharp ridge backwards, basal part forming a large triangular obtuse tooth with a much smaller and rounded one at the base

the right with two large apical teeth, a third smaller one immediately below, basal portion forming a rounded tooth at the tip below the 3rd tooth; antennæ 15-jointed, basal joint more than twice as long as the 2nd and much broader, 3rd shorter than 2nd and 4th and not quite so broad, 5th shorter than 4th, 6th and following longer than broad, thickly hairy, 14th not twice as long as broad, apical joint longest, more than twice as long as broad, sharply pointed; prothorax slightly excised in the middle of the front margin, rounded at the anterior angles and tapering sharply to the rounded hind angles, fairly deeply excised in the middle of the hind margin, thickly hairy and with numerous small rounded yellow spot on the upper surface, the ordinary yellow marking behind the front margin is present with the median whitish line reaching backwards to the middle of its length; meso- and metathorax broader, dark fuscous in the centre; wings (Fig. 40 b) light ferruginous-greyish, comparatively short, the two anterior nervures strong, running parallel out to the beginning of the rounded tip, where both join; just before terminating there is usually a curved nervure running straight out into the membrane, then making a sharp turn and going out to the tip, thus enclosing an elongate, more or less oval, area at the tip of the wing, mediana running through the upper part of the wing, branching already near the middle of its length, with two more branches further out, which are usually forked and end at the tip, cubitus mostly with 8—9 oblique unforked nervures; in the hindwings the above described small area at the tip is generally also present, mediana divides itself in the middle of the wing into two long branches, the upper one of which mostly is forked at tip, cubitus sends out the same number of oblique nervures as in the forewing, but some of them are forked; legs of normal size; abdomen elongate with parallel sides, the chitinous plates of the ventral segments lighter coloured.

Measurements: Length of body with wings 13 mm, length of body without wings 7 mm, length of head 1,4 mm, breadth of head 1,12 mm, length of prothorax 0,53 mm, breadth of prothorax 0,93 mm, length of forewing 10,2 mm, breadth of forewing 2,6 mm, length of hindwing 9,9 mm, breadth of hindwing 2,8 mm, breadth of abdomen 2 mm.

Soldier (Text Fig. 42 a). Head light yellow, tips and median tooth of jaws darker.

Head distinctly longer than broad, rounded behind and on the sides, convex on the summit sloping down in front, eyes in shape of a darker rounded spot on each side behind the root of antennæ; clypeus small, slightly emarginate in front, giving the impression of being bilobed; labrum longer than broad, rounded on the sides, tapering to the rounded tip, with numerous hairs; jaws fairly broad and curved, with an obtuse median tooth near the middle; antennæ 15-jointed, slender, light yellow, basal joint about twice as long as 2nd, 3rd very small, showing tendency to coalesce together with the 4th, which is slightly shorter than the 2nd, 5th of about the same length as 4th, 6th and 7th distinctly longer, 8th to 14th gradually a little longer, though not quite twice as long as broad, 15th the longest, twice as long as broad, tapering to the tip; prothorax ridged in front, tapering on the sides to the rounded hind margin: legs of moderate size; abdomen elongate, rounded, pellucid, allowing the dark content of the intestines to shine through.

Measurements: Length of body with jaws 4,5 mm, length of head with jaws 1,81 mm, length of head without jaws 1,43 mm, breadth of head 1,04 mm, length of prothorax 0,38 mm, breadth of prothorax 0,63 mm, breadth of abdomen 1,33 mm.

Worker. Body whitish with light reddish-yellow head.

Head rounded on the sides and behind, basal part of clypeus rounded behind and at the sides, truncate in front, apical portion strongly rounded, labrum broad, rounded; eyes in shape of a dark rounded little spot behind the root of the antennæ as in the soldier; jaws as in the soldier but smaller, the dentation very similar; antennæ 15-jointed, 3rd joint nearly as long as 2nd, 4th and 5th rounded, about as broad as long, the following gradually longer, 12th, 13th and 14th twice as long as broad, 15th longest, more than twice as long as broad, sharply pointed; prothorax ridged as on the soldier; abdomen rounded at the sides, pellucid.

Measurements: Length of body 5 mm, length of head 1,43 mm, breadth of head 1,2 mm, length of prothorax 0,34 mm, breadth of prothorax 0,86 mm, breadth of abdomen 1,51 mm.

The species builds small nests of undetermined shape and colour near the roots of trees or smaller, darker galleries in rounded balls up to the size of a walnut under dead logs on the ground. The winged insects appear in November. Colosseum in Southern Queensland.

38: *Hamitermes lativentris* n. sp.

Imago. Very similar to the imago of *H. obtusidens* MjöB. but the fontanelle broader and more rounded on the sides and the reddish-yellow ring round the eyes not quite so broad, dentition of jaws very similar; antennæ also very similar, 15-jointed, but sometimes the third joint shows tendency to divide itself into two very short joints, the 13th and 14th joints are apparently longer than in *H. obtusidens* MjöB., being twice as long as broad (in *H. obtusidens* MjöB. not twice as long as broad); legs and abdomen similar; wings also very similar in form and colour; the curved nervure running out into the membrane and turning sharply towards the top is lacking; mediana branched already near the middle of the wing, sending out two or three nervures, cubitus with about 10 unforked oblique nervures; in the hindwing mediana is richly developed, sending out many branches to the tip.

Measurements: Length of body with wings 12 mm, length of body without wings 7 mm, length of head 1,05 mm, breadth of head 1,16 mm, length of prothorax 0,53 mm, breadth of prothorax 0,95 mm, length of forewing 10,3 mm, breadth of forewing 2,5 mm, length of hindwing 10 mm, breadth of hindwing 3 mm, breadth of abdomen 1,5 mm.

Soldier (Text Fig. 39 d). Light yellowish, head light reddish-yellow.

Head very much larger than in *H. obtusidens* MjöB., higher and more convex in the profil, sloping down sharply in front, broadest in the middle, rounded behind and on the sides; clypeus very small and narrow, whitish on the sides and at the front margin, which is slightly emarginate in the middle; labrum not broad, tapering sharply to the rounded tip; jaws very broad and stout reminding very much of the jaws in the soldier of *H. obeuntis* SILV., but not so strongly curved at the tips, with the same deep incision forming a freely

projecting median tooth, which, however, is not quite so sharp; antennæ 15-jointed, the 3rd joint quite free (in *H. obeuntis* SILV. coalescing with 4th), 6th to 14th much longer than broad, 15th narrow, more than twice as long as broad, tapering to the tip; prothorax ridged in front, rounded at the sides, hairy; legs long, hairy; abdomen very broad and rounded, of the same shape as in the soldier of *H. Hartmeyer* SILV. (see SILVESTRI's fig. 147, Taf. XX in »Die Fauna Südwest-Australiens, Bd II, Isoptera), cerci long.

Measurements: Length of body with jaws 5 mm, length of head with jaws 2,07 mm, length of head without jaws 1,65 mm, breadth of head 1,29 mm, length of prothorax 0,42 mm, breadth of prothorax 0,74 mm, breadth of abdomen 1,5 mm.

Worker. Elongate, whitish—light yellowish, head light reddish yellow.

Head rounded, flattened on the summit; basal part of clypeus more than twice as long as broad, rounded on the sides, apical part whitish, protruding in the middle; labrum broad and rounded at the tip; jaws broad and stout, with a dentition very similar to the one in *H. obtusidens* MJÖB., antennæ 15-jointed, 3rd joint either undivided or incompletely divided into two very short parts, 14th and 15th joint fully twice as long as broad; prothorax ridged, rounded; abdomen elongate, rounded.

Measurements: Length of body 5 mm, length of head 1,37 mm, breadth of head 1,18 mm, length of prothorax 0,49 mm, breadth of prothorax 0,71 mm, breadth of abdomen 1,6 mm.

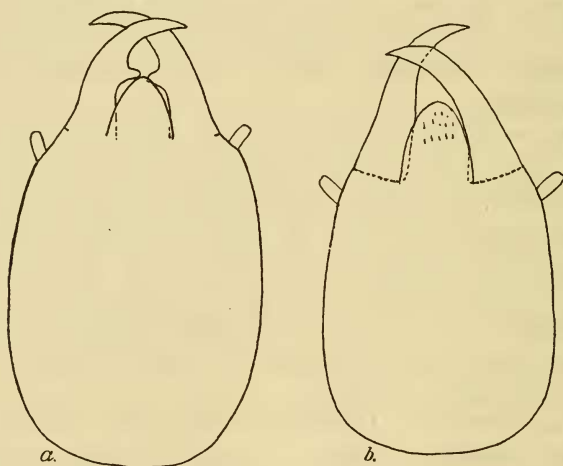
The species is in many respects closely allied to *H. obtusidens* MJÖB.; the imagines at first sight look quite similar, but prove to be quite distinct from each other at closer examination. The fontanelle is broader and more rounded and the apical joints of antennæ constantly different (see description); also in regard to the wings they are different. The soldier is very like the soldier of *H. obeuntis* SILV. but differs in the shape of the jaws and labrum and also in the joints of antennæ.

It lives under stones on the ground making very simple earthy galleries. Numerous winged insects, one soldier and many workers taken in November at Christmas Creek in Southern Queensland.

39. *Hamitermes latidens* n. sp.

Soldier (Text Fig. 43 a, 44). Body small, with dark abdomen and light yellow head.

Head small, rounded behind and at the sides, convex on the summit, slightly sloping down in the front, with scattered hairs; clypeus short, rounded at the sides, broadly emarginate in front, thus forming protruding, rounded anterior angles, jaws very short and sharply curved, very broad at the base, with a very broad and large, obtuse, triangular, median tooth, antennæ 14-jointed; basal joint twice as long



Text Fig. 43. a Head of soldier of *Hamitermes latidens* Mjöv. n. sp.
 b » » » » *Ahamitermes nidicola* Mjöv. n. sp.

and broad as the 2nd, 3rd shorter, tapering to the base, 4th shorter than 3rd, the smallest of all, 5th and following gradually longer, the two apical joints twice as long as broad; prothorax ridged in front, rounded on the sides; legs of moderate size; abdomen elongate, rounded, pellucid, showing the dark content of the intestines.

Measurements: Length of body with jaws 4 mm, length of head with jaws 1,65 mm, length of head without jaws 1,41 mm, breadth of head 0,95 mm, length of prothorax 0,3 mm, breadth of prothorax 0,59 mm, breadth of abdomen 1,4 mm.

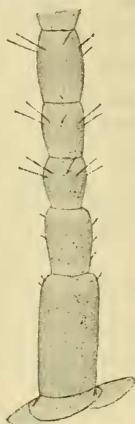
Worker. Body narrow, whitish, elongate, head light yellowish.

Head small, rounded; clypeus broad, rounded, apical part with the sides converging towards the front margin, which forms a broken line; jaws triangular with a dentition very similar to the one described in *H. obtusidens* MjÖB.; antennæ 14-jointed, 4th joint the shortest, 6th and following gradually becoming longer and longer, 12th and 13th nearly, 15th twice as long as broad; prothorax ridged in front, tapering sharply on the sides to the base, mesothorax rounded on the sides; legs moderate; abdomen elongate, whitish.

Measurements: Length of body 3,7 mm, length of head 1,05 mm, breadth of head 0,91 mm, length of prothorax 0,39 mm, breadth of prothorax 0,49 mm, breadth of abdomen 1,22 mm:

A distinct species, easily identified on the 14-jointed antennæ and the very characteristic shape of the jaws. It shows similarities to *H. heterognathus* SILV. from South West Australia, but the antennæ have only 14 joints and the jaws show different dentition, having the tooth not quite so broad and not so much directed forwards, and not situated so near the tip.

Numerous soldiers and workers under an old log near Alice River in Cape York Peninsula.



Text Fig. 44.
Basal joints of
antenna of
Hamitermes
latidens MjÖB.

Ahamitermes n. g.

Body small, of *Hamitermes*-type, head small, longer than broad, rounded behind; clypeus small, labrum long and broad, tapering to the tip, rounded; jaws short and stout, standing apart from each other, without median tooth; antennæ very short, 12-jointed; prothorax broad, only very slightly ridged in front.

40. *Ahamitermes nidicola* n. sp.

Soldier (Text Figs. 41 a, 43 b). Body whitish, head and thoracic segments light yellow, jaws rufous.

Head small, slightly tapering forwards, longer than broad, rounded behind; basal part of clypeus very short, yellow,

apical part whitish, labrum large and broad, tapering on the sides, rounded at tip, hairy; jaws very short and stout, broad at the base, curved, without any dentition whatsoever (on the innerside of the left jaw there are two very minute, hardly visible »teeth«); antennæ light yellow, basal joint very stout, 2nd only half so long and half so broad, 3rd very short, only half so long as 2nd, 4th of the same length as 2nd, 5th much broader than 4th, but of about the same length, 5th and following gradually longer and longer, but only the apical joints reaching a length being twice the breadth, elongate, rounded at tip; prothorax broad, very slightly ridged in front, rounded at the sides, tapering to the base, meso- and metathorax flatter and broader; legs comparatively short, thighs fairly thick, tarsi long and slender; abdomen whitish, rounded at the sides.

Measurements: Length of body with jaws 4,4 mm, length of head with jaws 1,56 mm, length of head without jaws 1,31 mm, breadth of head 0,87 mm, length of prothorax 0,29 mm, breadth of prothorax 0,72 mm, breadth of abdomen 1,4 mm.

A single soldier found in the lateral parts of the nest of *Coptotermes lacteus* FROGG. at Alice River in Cape York Peninsula.

Genus *Mirotermes* SILV.

Of this cosmopolitan genus, hitherto known in about 44 different species, only two species, *M. krisiformis* FROGG. from New South Wales and *M. Kræpelini* SILV. from Southwest Australia were known from the Australian continent. After a careful examination of my large material I come to the conclusion that the genus is fairly well represented in Australia, not less than 6 species proving to be new ones. This brings the number of Australian species up to 8. Undoubtedly many more species are to be found in the vast continent. The *Mirotermes* species live all in the open savannah forest country. They live as a rule in the nests, or in the deserted ones, constructed by other termites. Only some species in North Queensland build their own nests, either on the ground or at the base of the trunks of trees (Plate 5, fig. 2).

In the following key the soldiers of the 8 hitherto known species are tabulated.

Key

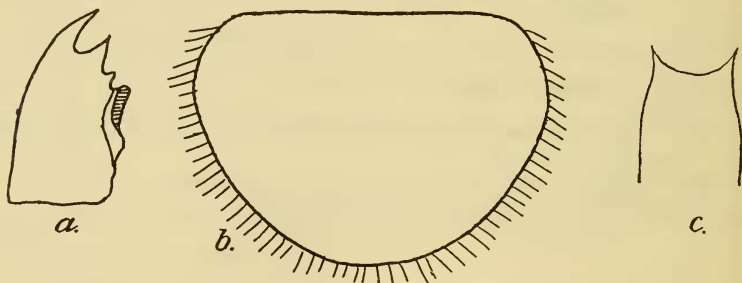
to the soldiers of the 8 different Australian *Mirotermes*-species.

- I. Frontal process very small more or less rudimentary 1.
M. krisiformis FROGG.
 Distribution: N. S. Wales.
- II. Frontal process very well developed.
- A. Frontal process directed upwards.
- a. Species of moderate size; frontal process very sharp, strongly directed upwards (Plate 2, Fig. 1) 2.
M. Maideni MJÖB.
 Distribution: N. Queensland.
- b. Very large species, frontal process not very strongly directed upwards 3.
M. Harrisii MJÖB.
 Distribution: N. Queensland.
- (Plate 2, Fig. 2.)
- B. Frontal process directed more forwards or only the extreme tip pointing upwards.
- a. Frontal process very long and sharp.
1. Head long, frontal process long 4.
M. Cheeli MJÖB.
 Distribution: N. Queensland.
- (Plate 2, Fig. 4, Text Fig. 46, 47.)
2. Head shorter, frontal process shorter (Text Fig. 48, 49), length of head 5.
M. Alleni MJÖB.
- b. Frontal process stout and more obtuse or smaller.
- Frontal process stout, more obtuse 6.
M. broomensis MJÖB.
 Distribution: N. W. Australia.
- (Plate 2, Fig. 3, Text Fig. 50.)
2. Frontal process small, pointing upwards at the extreme tip.
- *. Labrum slightly produced at the anterior angles 7.
M. alicensis MJÖB.
 Distribution: Alice River, N. Queensland.
- (Text Fig. 51, 52.)
- *. Labrum not produced at the anterior angles (see SILVESTRI, l. c., Taf. XIX, Fig. 133—135) 8.
M. Kræpelini SILV.

41. *Mirotermes Harrisi* n. sp.

Imago (Pl. 2, Fig. 9, Text Fig. 45). Body elongate, with parallel sides, light yellow, head, prothorax and chitinous plates of abdomen dark brown; eyes black.

Head, small rounded, flattened on the summit, emarginate in front, darker brown than other parts, with numerous, small, rounded, yellow spots and a larger, yellow spot near the sides behind the basal part of clypeus; eyes very large, rounded coarsely faceted, projecting, surrounded with a narrow reddish-yellow ring; ocelli very large, rounded, almost circular; fontanelle consisting of a very narrow streaklike yellow spot with a small rounded one immediately in front



Text Fig. 45. a Left jaw of imago of *Mirotermes Harrisi* MjöB. n. sp.
 b Prothorax » » » » » »
 c Labrum » soldier » » » » »

of it; basal part of clypeus light yellow, rounded and tapering on the sides towards the truncate front margin; apical part whitish, rounded; labrum of moderate size, rounded at tip; jaws stout, with very characteristic dentition, the left jaw with a very sharp, large apical tooth and a double one immediately below, consisting of a large anterior tooth and a smaller, rounded posterior one, both united by a thin portion, further below there is a characteristic and beautifully sculptured rounded portion, the right has a large curved apical tooth, a second not so sharp one further down and a rounded basal part; antennæ long, dark fuscous-brown, basal joint very stout, twice as long and twice as broad as the 2nd, 3rd a double-joint with a light cross-suture, but not showing any lateral incisions, considerably longer than 2nd,

tapering to the base, 4th broad, rounded, 5th slightly smaller than 4th, 6th and following gradually longer and longer, pear-shaped, the three last ones twice as long as broad, apical joint elongate, rounded at tip; all joints thickly and shortly hairy; prothorax small, slightly emarginate on each side of the middleline and slightly excised in the middle with a dark median line commencing at the front margin and continuing to about a fourth part of its length, partly running through a yellowish triangular median marking, anterior angles rounded, sides tapering strongly to the base, before the middle of the hind margin there is another yellow marking, thickly hairy; meso- and metathorax partly brown; wings light greyish, fairly short and rounded at tip, the two anterior strong nervures joining at the beginning of the rounded portion, the second one very thick and dark coloured; mediana running straight and unbranched through the upper part of the wing, cubitus richly developed, with about 10 oblique, mostly unforked nervures; legs short, thickly hairy; abdomen with parallel sides, basal joint of cerci very stout and broad.

Measurements: Length of body with wings 12 mm, length of body without wings 7,15 mm, length of head 1,17 mm, breadth of head 1,06 mm, length of prothorax 0,63 mm, breadth of prothorax 0,89 mm, length of forewing 9 mm, breadth of forewing 2,5 mm, length of hindwing 8,5 mm, breadth of hindwing 2,8 mm, breadth of abdomen 1,4 mm.

Soldier (Plate 2, Fig. 2, Text Fig. 45 c). Whitish, head reddish-orange, jaws black.

Head longer than broad, nearly truncate at the hind margin, rounded at the posterior angles, parallel on the sides, frontal process very much turned-up, sharp, of the type as illustrated by Pl. 2, Fig. 2, its upper margin more darkly lined, continuing laterally and ending in a small tubercle on each side of the process; labrum whitish-yellow, sharply produced into sharp tips at the anterior angles; jaws with an extra small obtuse tooth above the base, antennæ 14-jointed, light yellow, 3rd joint slightly longer than 2nd, 4th the shortest, 13th more than twice as long as broad, 14th elongate, still longer, rounded at tip; prothorax ridged in front, slightly emarginate in the middle, rounded at the sides; abdomen whitish, shortly hairy.

Measurements: Length of body with jaws 6,2 mm, length of head with jaws 3,2 mm, length of head without jaws 1,09 mm, breadth of head 1,24 mm, length of prothorax 0,44 mm, breadth of prothorax 0,7 mm, breadth of abdomen 1,48 mm.

Worker. Whitish, elongate, head very light yellow.

Head rounded whitish in front, basal part of clypeus swelled at the sides and in front, divided by a light median line, apical part smaller, rounded at tip, with whitish median line; left jaw with one sharp apical tooth and a smaller one below and a rounded angular protruding part, the right one with similar dentation; antennæ 14-jointed, 2nd joint only little shorter than 1st, 3rd and 4th short of about the same length, 13th and 14th twice as long as broad; prothorax ridged, hairy; abdomen rounded, pellucid, the dark content of intestines shining through.

Measurements: Length of body 4 mm, length of head 1,1 mm, breadth of head 0,87 mm, breadth of abdomen 1,5 mm.

One winged insect and numerous soldiers and workers found in a deserted nest of another termite (*Coptotermes?*) in the open forest-country near Cedar Creek in North Queensland.

I have named this species in honour of the Director of the Queensland museum Dr HAMLYNE HARRIS.

42. *Mirotermes Maidenii* n. sp.

Soldier (Plate 2, Fig. 1). Body unusually large, whitish, head light yellow, upper surface of frontal process lighter coloured.

Head longer than broad, large, rounded behind, with nearly parallel sides, frontal process strong, turned upwards, sharply pointed, hairy sides lined with darkbrown; labrum whitish, with the anterior angles produced into sharp tips; jaws long and stout, the left one with a very large basal tooth; antennæ 14-jointed, long and slender, basal joint curved at the interior margin, not twice as long as the 2nd, 3rd slightly longer than 4th, 5th and following gradually longer, 8th to 11th the longest, nearly three times as long

as broad, following slightly shorter, apical joint elongate, rounded at tip; prothorax ridged in front, slightly emarginate at the top; in the middle hairy, rounded at the sides; abdomen oval, the dark content of intestines shining through.

Measurement: Length of body with jaws 8 mm, length of head with jaws 5 mm, length of head without jaws 2,5 mm, breadth of head 1,67 mm, length of prothorax 0,38 mm, breadth of prothorax 0,93 mm, breadth of abdomen 1,83 mm.

Worker. Whitish with dark abdomen.

Head rounded, yellowish, lighter in front, basal part of clypeus broad, divided in the middle, apical part membranaceous; labrum deeply emarginate at the sides, rounded at tip; dentition of jaws as in worker of *M. Harrisii* MJÖB.; antennæ 14-jointed, whitish, joint gradually longer and longer, 10th—13th twice as long as broad, 14th the longest, pointed at the tip, prothorax slightly ridged, whitish, rounded at the sides; abdomen rounded, the dark content of intestines shining through.

Measurements: Length of body 4,7 mm, length of head 1 mm, breadth of head 1,05 mm, breadth of abdomen 1,75 mm.

A very distinct species, hitherto the longest of its genus in Australia. Numerous soldiers and workers taken near Cooktown in North Queensland under a log on the ground, where they had formed smaller earthy galleries.

Named in honour of the Director of the Sydney Botanical Gardens, Mr J. H. MAIDEN.

43. *Mirotermes Cheeli* n. sp.

Soldier (Plate 2, Fig. 4, Text Fig. 46, 47). Body whitish, elongate, head light yellow, jaws black.

Head very long, more than $1\frac{1}{2}$ as long as broad, with parallel sides, slightly rounded behind, profile as in Pl. 2, Fig. 4; a median line and upper surface of frontal process lighter in colour; frontal process very large and pointed, thickly hairy, lined with dark at the upper margins; labrum very small with parallel sides, truncate in front, only the extreme anterior corners slightly produced; jaws very long, slightly curved, basal tooth of the left jaw very broad at the base,

cylindrical at the tip; antennæ 14-jointed, slender, 3rd joint broadest in the middle, longer than 2nd, 4th shorter than 3rd, 5th and 6th as long as 3rd, following gradually lengthening, 8th to 10th longest, more than twice as long as broad, two apical ones long and slender, longer than 12th; prothorax ridged, tapering strongly at the sides; abdomen very long, narrow.

Measurements: Length of body with jaws 6 mm, length of head with jaws 3,7 mm, length of head without jaws 1,78 mm, breadth of head 1,06 mm, length of prothorax 0,37 mm, breadth of prothorax 0,7 mm, breadth of abdomen 1,02 mm.

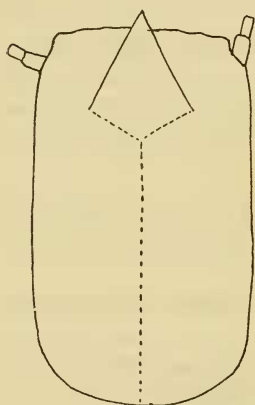
Worker. Whitish, head light yellow, whitish in front.

Head rounded, broadest in front, basal part of clypeus oval in shape, dotted with numerous small darker spots, jaws with a similar dentition as described in the worker of *M. Harrisii* MjÖB.; antennæ 14-jointed, basal joints twice as long as the 2nd, 3rd and 4th very short, 5th short, much broader than long, 6th and following gradually longer, but only the apical one twice as long as broad; prothorax small, rounded at the sides; abdomen long and narrow.

Measurements: Length of body 4 mm, length of head 0,99 mm, breadth of head 0,82 mm, breadth of abdomen 1,35 mm.

Queen. Head and thorax light-brown, abdomen whitish with 8 very narrow and short chitinous plates.

Head comparatively very small, rounded behind and at the sides, deeply emarginate in front; eyes coarsely faceted but not very much projecting; ocelli large, crescent-shaped, fontanelle in shape of a little narrow streak, broadest behind, tapering forwards; basal part of clypeus divided by a median, dark suture, truncate in front; labrum broad, rounded in front; jaws with similar dentition as *M. Harrisii* MjÖB.; antennæ fuscous, 3rd joint very short and not so broad as surrounding joints, following gradually longer; prothorax much broader than long, with a very faint median

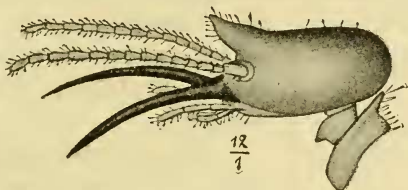


Text Fig. 46. Profile from above of soldier of *M. Cheeli* MjÖB.

line in front, tapering on the sides, emarginate at the hind-margin, thickly hairy.

Measurements: Length of body 18 mm, length of head 0,8 mm, breadth of head 0,84 mm, length of prothorax 0,29 mm, breadth of prothorax 0,74 mm, breadth of abdomen 4 mm.

This species is closely allied to the following one; it is easily identified by the very long and narrow head and the characteristic profile with the very large and sharp frontal process, which is more turned-up at the tip than in the following *M. Alleni* n. sp. It dwells in the open dry savannah forest country near Laura and the surrounding regions in Cape York Peninsula, where it builds regular nests



Text Fig. 47. Head and prothorax of soldier of *Mirotermes Cheeli* MjöB. variety from Laura, N. Q.

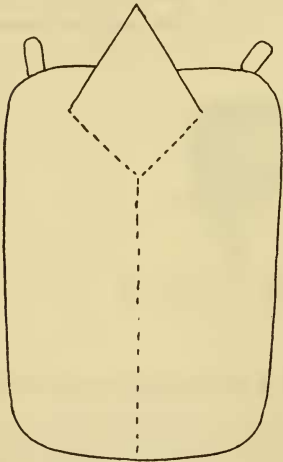
of black brittle material on the base of tree-trunks (see Plate 5, Fig. 2), or on the ground direct, as was the case with a nest near Hann Creek. It resembles somewhat the nest of *Microcerotermes Turneri* FROGG., is about 35 cm in height and as large in diameter near the base. When built on trees it is generally more elongate. Three queens were found in the ground-nest in September in the centre near the ground.

Some soldiers from a black nest on a tree-trunk at Laura are slightly different in profile and have a more straight frontal process; the head itself seems to be slightly lower behind in the profile and slightly more impressed across the middle (Text Fig. 47). The anterior corners of labrum are rounded; I regard it preliminarily as a variety.

44. *Mirotermes Alleni* n. sp.

Soldier (Text Figs. 48, 49). Head light yellow, jaws black.

Head very short, much shorter than in *M. Cheeli* MjÖB., very slightly tapering on the sides to the rounded hind-margin, broadest opposite to the root of antennæ; frontal process short and stout, pointed at tip, labrum tapering slightly to the rounded front margin; tooth of left jaw long, cylindrical; antennæ 14-jointed, basal joint very stout, twice as long and twice as broad as the 2nd, 3rd slightly longer than 2nd, rounded on the sides, 4th slightly shorter than 3rd, 5th and following gradually longer, more than twice as long as broad, apical joint very narrow, tapering to the tip, three times as long as broad; prothorax narrow, ridged in front; abdomen whitish, rounded.



Text Fig. 48. Head (from above) of the soldier of *Mirotermes Alleni* MjÖB. n. sp.

Measurements: Length of body with jaws 5 mm, length of head with jaws 3,5 mm, length of head without jaws 1,56 mm, breadth of head 0,89 mm, length of prothorax 0,3 mm, breadth of prothorax 0,57 mm, breadth of abdomen 0,95 mm.

Worker. Body elongate, narrow, head light-yellow behind, lighter in front.

Head small, rounded flattened on the summit; jaws stout and broad; the left one with two apical teeth and a strongly projecting basal part; second apical tooth of right jaw longer than in the left, basal portion much broader and longer.

Measurements: Length of body 4 mm, length of head 0,91 mm, breadth of head 0,78 mm, breadth of abdomen 1,05 mm.

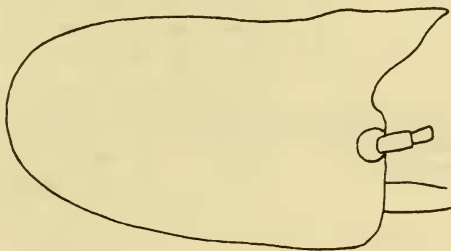
The species lived in a small dark ground-nest near Cooktown in North Queensland.

Named in honour of Mr. ALLEN, Cairns.

45. *Mirotermes broomensis* n. sp.

Soldier (Plate 2, Fig. 3, Text Fig. 50). Head and antennæ light yellow, abdomen pellucid, showing the dark content of intestines.

Head very broad, with parallel sides, front process very broad, stout, of the shape as shown in Text Fig. 50, straight beneath, bordered with darkbrown along its upper margin, and showing a lateral chitinous, vertical band on the sides; jaws long and narrow, slightly curved, the left one with an obtuse cylindrical tooth and a deep, rounded excision immediately in front of it; labrum whitish, anterior angles strongly prolonged into sharp tips, somewhat resembling the labrum in the soldier of *M. Harrisi* MJÖB.; antennæ 14-jointed, basal



Text Fig. 49. Profile of head of soldier of *Mirotermes Alleni* MJÖB.

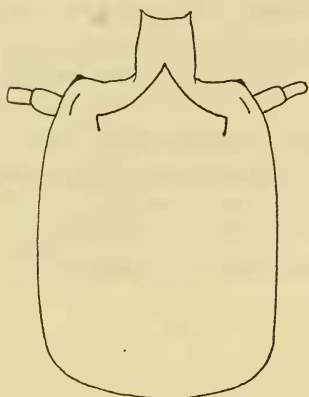
joint not quite twice as long and twice as broad as the 2nd, 3rd more rounded at the sides, of about the same length as 2nd and 4th, 5th considerably longer, 6th to 9th the longest, 10th to 13th slightly shorter and not quite so broad, 14th elongate, rounded, nearly thrice as long as broad; prothorax fairly broad, ridged in front, rounded at the sides and tapering to the base; meso- and metathorax also rounded at the sides; abdomen elongate, rounded; cerci very long and thin.

Measurements: Length of body with jaws 7 mm, length of head with jaws 4,2 mm, length of head without jaws 1,73 mm, breadth of head 1,2 mm, length of prothorax 0,36 mm, breadth of prothorax 0,8 mm, breadth of abdomen 1,35 mm.

Worker. Body whitish, abdomen dark.

Head small, rounded; labrum broad, rounded at the tip; basal part of clypeus large, divided by a faint suture; den-

tition of jaws characteristic, the left one with a very sharp apical tooth and a median triangular one further down, basal portion small, rounded, projecting, the right one with a large apical tooth and a median obtuse, triangular one, basal portion not projecting; antennæ 14-jointed, 14th the longest, about thrice as long as broad; prothorax slightly ridged in front, whitish; abdomen rounded, shortly hairy.

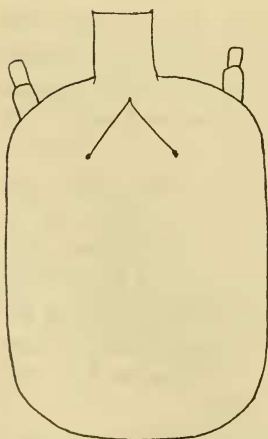


Text Fig. 50. Profile from above of head of soldier of *M. broomensis* MJÖB.

Measurements: Length of body 4,2 mm, length of head 0,86 mm, breadth of head 1 mm, breadth of abdomen 1,5 mm.

A characteristic species easily recognizable by its broad and short head and the peculiar frontal process. It does not seem to build its own nests, but lives in the side-galleries of *Eutermes nigerrimus* MJÖB. in smaller communities. Broome, N. W. Australia.

64. *Hamitermes alicensis* n. sp.



Text Fig. 51. Profile from above of soldier of *H. alicensis* MJÖB.

Soldier (Text Figs. 51, 52). Head light yellow, abdomen dark.

Head long and broad, with parallel sides, rounded behind; frontal process very small, sharply turned up at the tip, with a small fuscous tubercle on each side; labrum fairly broad, slightly prolonged into tips at the anterior angles; jaws long, black, irregularly curved; antennæ 14-jointed, 3rd joint broader than 2nd and 4th, 7th to 11th long and slender, 12th shorter, following two joints longer again, apical one pointed; prothorax small, slightly ridged in front, thickly hairy, abdomen dark.

Measurements: Length of body with jaws 6,2 mm, length of head with jaws 3,8 mm, length of head without jaws 2,3 mm, breadth of head 1,27 mm, length of prothorax 0,36 mm, breadth of prothorax 0,82 mm, breadth of abdomen 1,43 mm.

This species reminds not a little of *M. Kræpelini* SILV., but is larger in size with a small tubercle on each side of the frontal process and has labrum differently shaped. Only one single soldier found in the side-galleries of *Coptotermes lacteus* FROGG. near Coleman River in Cape York Peninsula.



Text Fig. 52. Profile of head of soldier of
H. alicensis MJÖB.

Genus *Microcerotermes* WASM.

Of this genus hitherto three species were known from the Australian continent, *M. Turneri* FROGG. from Queensland, *M. serratus* FROGG. from N. Queensland and *M. distinctus* SILV. from Southwest Australia.

My material contains not only the three already described but also two new species, bringing the number of Australian species up to five. In the following I give a key to the soldiers of the species and also a key to the three hitherto known imagines.

Key

to the Australian species of the genus *Microcerotermes* WASM.
based upon the characters of the soldiers.

I. Head small, narrow, jaws short.

A. Jaws stout, head very long, twice as long as broad (see SILVESTRI,
l. c., Fig. 176, Taf. XX).

M. distinctus SILV.

Distribution: W. Australia.

- B. Jaws slender, head much shorter, not twice as long as broad (Text Fig. 55).
M. parviceps MjöB. n. sp.
 Distribution: S. Queensland.
- II. Head large, jaws long and slender.
- A. Head twice as long as broad. *M. serratus* FROGG.
 Distribution: N. Australia.
- B. Head twice as long as broad, more rounded at the sides.
1. Head reddish-yellow; more rounded at the sides.
M. excisus MjöB. n. sp.
 Distribution: S. Queensland.
 (Text Fig. 57.)
2. Head pale ochreous, not so much rounded at the sides.
M. Turneri FROGG.
 Distribution: Queensland.
 (See FROGGATT, l. c., Pl. XXXIV, Fig. 8.)

Key

to three hitherto known imagines of the Australian *Microcerotermes* species.

- I. Prothorax deeply excised in the centre of the hind margin.
 (Text Figs. 53 a, 56.) *M. excisus* MjöB. n. sp.
- II. Prothorax not deeply excised in the centre of the hind margin.
- A. Head small, prothorax slightly curved in the centre of the hind margin.
 (Text Figs. 53 b, 54.) *M. parviceps* MjöB. n. sp.
- B. Head larger, prothorax not excised in the centre of the hind margin.
M. Turneri FROGG

47. *Microcerotermes distinctus* SILV.

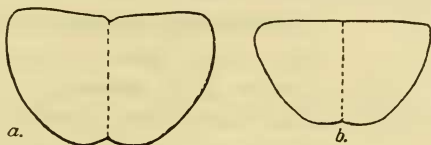
This species is apparently closely allied to *M. Biroi* DESN. and also to *M. serratus* FROGG. but differs in having a longer and more narrow head and shorter and stouter jaws, which are more sharply curved at the tips. My specimens of soldiers from North West Australia all show these characters. Thence I have no hesitation in referring them to SILVESTRI's new species from S. W. Australia. It does not seem to build a special nest, but forms simple galleries under wooden pieces on the ground.

Soldiers and workers taken in the vicinity of Derby (12/10).

48. *Microcerotermes parviceps* n. sp.

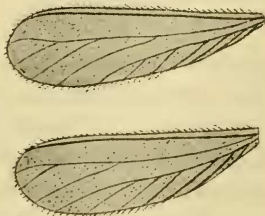
Imago (Text Figs. 53 b, 54). General colour fuscous, meso- and metathorax and underside light yellowish.

Head dark fuscous, clypeus and mouth-parts lighter coloured, much smaller than in *M. Turneri* FROGG. to which species it apparently is closely related, rounded at the sides and behind, flattened on the summit; eyes not quite so large; ocelli circular round, smaller than in *M. Turneri* FROGG.; clypeus and labrum as in *M. Turneri* FROGG.; jaws stout, the left one with two very sharp apical teeth and a third very sharp one in the middle (directed backwards)



Text Fig. 53. a Prothorax of imago of *Microcerotermes excisus* MJÖB. n. sp.
 b " " " " " " *parviceps* MJÖB. n. sp.

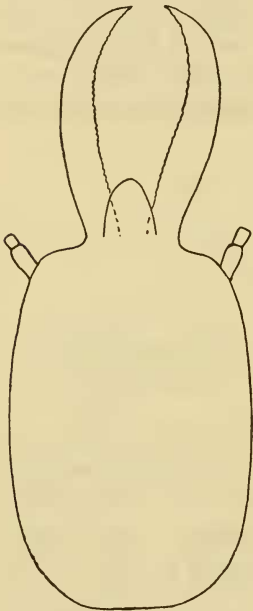
connected by a sharp edge with the 2nd apical tooth, basal portion triangular, the right one with two very sharp angular teeth as in the left one, but the median tooth very broad and triangular, and the basal portion broader, only slightly projecting (in *M. Turneri* FROGG. the basal portion of the left one is much broader and not so projecting and the third, median tooth not so sharp), prothorax smaller, more convex, shorter, anterior angles more broadly rounded and sides not quite so sharply tapering to the base, slightly excised in the middle of the hind margin; wings (Text Fig. 54) small, and narrow, venation variable, greyish-fuscous, mediana running through the upper part of the wing, sending out a variable number of branches, forked at the tip; legs moderate, light yellow; abdomen with parallel sides, with 10 dorsal chitinous plates.



Text Fig. 54. Wings of *Microcerotermes parviceps*
 MJÖB. n. sp.

Measurements: Length of body with wings 8,8 mm, length of body without wings 5 mm, length of head 0,89 mm, breadth of head 0,84 mm, length of prothorax 0,38 mm, breadth of prothorax 0,7 mm, length of forewing 7,2 mm, breadth of forewing 1,79 mm, length of hindwing 7 mm, breadth of hindwing 1,94 mm, breadth of abdomen 1,05 mm.

Soldier (Text Fig. 55). Yellow-whitish, head bright rufous, jaws black.



Text Fig. 55. Head of soldier of *Microcerotermes parviceps* MJÖB. n. sp.

Head much smaller and shorter than in *M. serratus* FROGG., apical part of clypeus whitish, tapering on the sides to the front margin, slightly prolonged in the middle; labrum not so pointed as in *M. serratus* FROGG., but more broadly rounded at tip, hairy; jaws very much shorter than in the species just referred to, and slightly more bent, finely serrated at the inner margin; antennæ 14-jointed, much shorter and thinner, reaching slightly over the tips of the jaws, 3rd joint the smallest, joints rounded and short, apical joint pointed; prothorax small, whitish, slightly ridged in front, tapering from the broadly rounded anterior angles to the hind margin; abdomen shorter, whitish.

Measurements: Length of body with jaws 5 mm, length of head with jaws 2,5 mm, length of head without jaws 1,62 mm, breadth of head 0,86 mm, length of prothorax 0,32 mm, breadth of prothorax 0,61 mm, breadth of abdomen 1 mm.

Queen. Whitish, head, thorax and legs and seven dorsal chitinous small plates fuscous; abdomen cylindrical, the ventral chitinous plates very small, lighter coloured in the middle.

Dimensions: Length of body 20 mm, length of abdomen 17,8 mm, breadth of abdomen 4,1 mm.

Worker. Very similar to the worker of *M. Turneri* FROGG. and *M. excisus* MJÖB.

Head longer than broad, light reddish yellow, jaws broad,

the left one with two large, sharp apical teeth, a sharp smaller one below and a sharply projecting triangular basal portion, the right one with two large apical teeth, a very broad and obtuse one immediately below and a broad, not projecting basal portion; antennæ short, whitish, hairy, 3rd joint smallest, joints rounded at the sides, gradually longer and longer, apical joint twice as long as broad; abdomen whitish, elongate, sharply hairy.

Measurements: Length of body 4,5 mm, length of head 0,95 mm, breadth of head 0,8 mm, breadth of abdomen 1,24 mm.

This species builds smaller galleries and ducts under trunks and logs on the ground. Winged insects together with one queen, soldiers and workers found at Colosseum, Southern Queensland, in November.

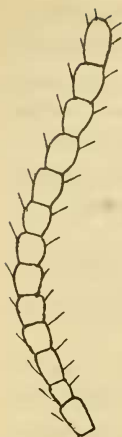
49. *Microcerotermes serratus* FROGG.

To this species I refer soldiers and workers from Cooktown in North Queensland. There are also some workers and a soldier from Broome in North West Australia, which I preliminary refer to the above species. — Lives under logs or stumps on the ground, making temporary galleries and ducts.

50. *Microcerotermes excisus* n. sp.

Imago (Text Figs. 53 a, 56, 57). General colour dark brown, under surface lighter.

Head very dark, forehead lighter, arcuate, rounded behind and at the sides, flattened on the summit; eyes large, more flattened and not quite so rounded and projecting as in *M. Turneri* FROGG.; ocelli longer and not so rounded as in *M. Turneri* FROGG., more reniform; basal part of clypeus divided by a median dark suture, light fuscous, more than twice as broad as long, rounded at the sides, truncate in front, apical part whitish, membranaceous, prolonged in the middle; labrum large, rounded at the tip; jaws large, the left one with two sharp apical teeth and a smaller, more obtuse one further down, connected with the second apical one by a sharp edge, basal part forming a rounded obtuse projecting process, the



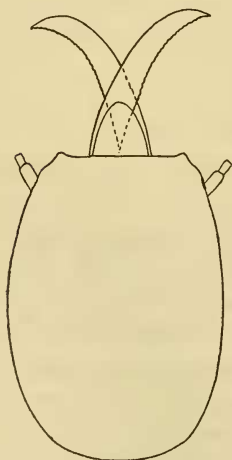
Text Fig. 56.
Antenna of
imago of *Microcerotermes*
excisus MJÖB.
n. sp.

right one with two sharp apical teeth, a sharp edge below and a broad, not projecting basal part; antennæ fuscous, 14-jointed,¹ basal joint darkest, nearly twice as long and twice as broad as 2nd, 3rd very short, 4th twice as long as 3rd, 5th and following longer, rounded, but not twice as long as broad, 14th oval; prothorax of very characteristic shape, not quite twice as broad as long, broadly emarginate at the front margin, slightly excised in the centre, anterior angles broadly rounded, tapering strongly backwards, the whole upper surface thickly covered with long hairs, with light median line, deeply excised in the middle of the hind margin, meso- and metathorax longer, flattened; wings greyish-fuscous, venation variable; mediana running through the middle of the wing, sending out a variable number of forked or unforked branches; cubitus with 10—12 oblique nervures, legs of moderate

size, tighs fuscous with darker tips of femora, thickly hairy, claws long; abdomen with parallel sides, thickly hairy, with 10 dark fuscous chitinous dorsal plates; chitinous plates on the ventral side interrupted in the centre; cerci small.

Measurements: Length of body with wings 8,5 mm, length of body without wings 5,2 mm, length of head 0,87 mm, breadth of head 0,89 mm, length of prothorax 0,42 mm, breadth of prothorax 0,76 mm, length of forewing 8,40 mm, breadth of forewing 2,2 mm, length of hindwing 8 mm, breadth of hindwing 2,5 mm, breadth of abdomen 1,06 mm.

Soldier (Fig. 57). Very like the soldier of *M. Turneri* FROGG. but head more reddish in colour and more rounded, not quite so truncate in front, 3rd and 4th joint not showing any tendency to coalesce together.



Text Fig. 57. Head of soldier of *Microcerotermes*
excisus MJÖB. n. sp.

¹ According to FROGGATT (l. c., p. 736) the antennæ of the imago of *M. Turneri* FROGG. has only 13 joints, but undamaged specimens of the same specimen determined by FROGGATT himself show 14 distinct joints.

Measurements: Length of body with jaws 5 mm, length of head with jaws 3 mm, length of head without jaws 1,82 mm, breadth of head 1,24 mm, length of prothorax 0,34 mm, breadth of prothorax 0,46 mm.

Worker. Whitish, elongate, head light reddish-yellow.

Head rounded, longer than broad, flattened on the summit; basal part of clypeus light yellow, divided by a dark median suture, apical part whitish, labrum broad, rounded; jaws broad, nearly rectangular, the left one with two large apical teeth, a median, more obtuse tooth and a projecting obtuse lower part, in the right one the median tooth is much broader and more obtuse and the lower part broader, but not projecting; antennæ 13-jointed, short, whitish, joints short and rounded, gradually becoming more slender towards the tip.

Measurements: Length of body 4,3 mm, length of head 1,03 mm, breadth of head 0,99 mm, breadth of abdomen 1,25 mm.

Apparently closely allied to *M. Turneri* FROGG., but differs distinctly by the shape of the head, the size of the eyes, the shape of the ocelli and above all by the very characteristic shape of the prothorax of the imago; also the soldiers differ in the shape of the head and in the colour.

The species lives in the open forest-country, where it builds small nests of dark colour up to a height of 35—50 cm and reaching a diameter of about 45 cm (see Plate 6, Fig. 1). The nests are often deeply rooted in the ground, and were probably originally started over a stump in the ground. Sometimes one finds big stones built into the nest, which consists of a harder clay casing with small darker pieces on top, and a more brittle interior, containing the galleries. The winged insects were obtained in large number at the bottom of a nest near Glen Lamington in Southern Queensland not far from Christmas Creek.

The nest, is now among the collections of the State Museum at Stockholm.

51. *Microcerotermes Turneri* FROGG.

To this species I refer some soldiers and workers from Laura in North Queensland and from Yandina and Mt. Tam-

bourine in Southern Queensland. It builds small dark nests of similar type as *M. excisus* MJÖB.; winged insects were obtained in large number in the nests in October.

General view on the Australian Termite-Fauna.

Our knowledge of the Australian termite-fauna on the whole up to year 1918 must be said to be very scanty, not more than 43 species being known. By my material alone, the number of species has been very nearly doubled, no less than 36 species proving to be undescribed. But even this number is very small compared with the great size of the Australian continent with its variegated life conditions. I do not doubt myself that a thorough survey of the Australian termite fauna in the future will prove that a couple of hundred species live within the continent. That so very few species thrive in New Zealand (2) and in Tasmania (2) it clearly due to the harder climate, though undoubtedly more species will be discovered there.

Of the 79 hitherto known Australian termites the imagines of 29, the soldiers of 8 and the workers of 16 are yet unknown. A monography of them would therefore be not only difficult, but also incomplete at present. It is to be hoped that future collectors in Australia will pay more attention to this most interesting group of insects.

The 79 Australian termite-species are distributed over the four families in the following proportions.

Fam. <i>Mastotermitidæ</i>	1 sp.
Fam. <i>Protermitidæ</i>	22 spp.
Fam. <i>Mesotermitidæ</i>	9 spp.
Fam. <i>Metatermitidæ</i>	47 spp.

Sum 79 spp.

As regards the distribution of the species, it will be found that many, if not most of the species are so far as we know comparatively restricted in their range. Thus a very great number of species are hitherto recorded only from a single part of the continent. Only three species seem to have spread fairly well all over the continent. These are *Leucotermes erox* FROGG., *Coptotermes lacteus* FROGG. and *Hamitermes*

perniger FROGG. (the latter in Western, Central and Northern parts).

The species limited in their distribution to the two large southern islands all belong to the more primitive stock (*Protermitidæ*) and were very probably spread at an early time when the landcommunications were more intimate.

Of the remaining 72 species not less than 32 species seem to be limited in their distribution to the northern more or less tropical parts of the Australian continent, 1 (*H. rubriceps* FROGG.) is known only from the arid desert-like central parts. The other 39 species pass their life in the southern more temperate parts.

Most species live in the open sun-bathed savannah forests, where they find rich and varied conditions of life. Up to my visit to the tropical rain-forests or jungles in eastern Queensland not a single species has been recorded from this very typical and very strictly limited botanical regions. The following species, all new ones, I have found inhabiting the rain-forests, living mostly in decayed logs on the ground.

1. *Stolotermes queenslandicus* MJÖB. — N. Queensland.
2. *Stolotermes australicus* MJÖB. — N. »
3. *Calotermes malandensis* MJÖB. — N. »
4. *Calotermes paralleliceptus* MJÖB. — N. »
5. *Calotermes oculifer* MJÖB. — N. »
6. *Calotermes trilineatus* MJÖB. — N. »
7. *Calotermes dubius* MJÖB. — N. »
8. *Calotermes affinis* MJÖB. — S. »
9. *Parrhinotermes australicus* MJÖB. — N. »
10. *Eutermes pluvialis* MJÖB. — N. S. »
11. *Hamitermes herbertensis* MJÖB. — N. »

Not only in regard to the distribution, but also in regard to the life-history, our knowledge is very restricted. Very little attention has hitherto been paid to the nests and the habits of the various species. The only observer that has tried to study the termites also in the field, their ways of building the nests etc., is FROGGATT. During my two expeditions I have had splendid opportunities of making studies and notes of most of the 51 different species represented in the collections.

The members of the two first and most primitive families do not as far as their habits are known seem to construct free nests, but live a hidden life in the trunks of trees or in rotten logs, making irregular galleries and ducts of more or less temporary nature. As shown above, the most archaic type, *Mastotermes darwiniensis* FROGG. simply lives in the trunks, branches or roots of trees. The two new *Stolotermes*-species live a similar life in the jungles, as do also the six new *Calotermes* species.

Also many species belonging to the families *Mesotermitidæ* and *Metatermitidæ* live a very simple, most temporary, life under stones, stumps or logs on the ground, or under bark of trees, making small irregular ducts and galleries. So is the case with following species.¹

1. *Leucotermes ferox* FROGG.
2. *Coptotermes Michaelseni* SILV.
3. *Coptotermes acinaciformis* FROGG.
4. *Rhinotermes intermedius* BR.
5. *Rhinotermes reticulatus* FROGG.
6. *Eutermes fumigatus* BR.
7. *Eutermes apiocephalus* SILV.
8. *Eutermes pluvialis* MJÖB.
9. *Eutermes coalescens* MJÖB.
10. *Eutermes eucalypti* MJÖB.
11. *Eutermes Aagaardi* MJÖB.
12. *Eutermes Pülleinei* MJÖB.
13. *Hamitermes herbertensis* MJÖB.
14. *Hamitermes obtusidens* MJÖB.
15. *Hamitermes lativentris* MJÖB.
16. *Hamitermes latidens* MJÖB.
17. *Mirotermes krisiformis* FROGG.
18. *Mirotermes Alleni* MJÖB.
19. *Microcerotermes parviceps* MJÖB.
20. *Microcerotermes distinctus* SILV.

The following species seem to live in the nests or in old deserted ones of other nest-building species:

¹ Also some nest-building species occasionally do not construct nests, but live under stumps, stones, etc. on the ground, making temporary galleries. This is not seldom the case with *Coptotermes lacteus* FROGG., *Hamitermes meridionalis* FROGG, and others.



Text Fig. 58. *a* Nest of *Eutermes fumipennis* WALK. from Bookwole, New South Wales.
b Section of galleries from the nest of *Hamitermes perniger* FROGG. from N. W. Australia (both from the collections of the Swedish State Museum).

1. *Hamitermes kimberleyensis* MJÖB. — In nests of *Eutermes nigerrimus* MJÖB.
2. *Ahamitermes edentatus* MJÖB. — In nests of *Coptotermes lacteus* FROGG.
3. *Mirotermes Harrisii* MJÖB. — In deserted nests of *Coptotermes lacteus* FROGG.(?)
4. *Mirotermes broomensis* MJÖB. — In nests of *Eutermes nigerrimus* MJÖB.
5. *Mirotermes alicensis* MJÖB. — In nests of *Coptotermes lacteus* FROGG.

Nothing seem to be known or recorded about the life habits, or the nests, of the following species, which therefore deserve to be kept under strict observation by field workers.

1. *Stolotermes brunneicornis* HAG.
2. *Stolotermes ruficeps* BR.
3. *Porotermes Froggatti* HOLMGR.
4. *Porotermes grandis* HOLMGR.
5. *Calotermes insularis* WHITE.
6. *Calotermes irregularis* FROGG.
7. *Calotermes robustus* FROGG.
8. *Calotermes iridipennis* FROGG.
9. *Calotermes brevicornis* FROGG.
10. *Leucotermes platycephalus* FROGG.
11. *Coptotermes australis* WALK.
12. *Eutermes occasus* SILV.
13. *Eutermes ocellaris* MJÖB.
14. *Eutermes magnificus* MJÖB.
15. *Hamitermes obeuntis* SILV.
16. *Hamitermes Hartmeyerii* SILV.
17. *Hamitermes perornatus* SILV.
18. *Hamitermes heterognathus* SILV.
19. *Mirotermes Kræpelini* SILV.
20. *Microcerotermes serratus* FROGG.

The species which build regular stationary nests of more or less durable type are the following. The nest is either under the ground, appearing as a flat cake at the ground-level (Plate 4, Fig. 1), protruding as a lower or higher, rounded, conical, or column-shaped construction, or arboreal, i. e. built either on the trunk or high up in the summit of a tree.

1. *Coptotermes lacteus* FROGG.
2. *Eutermes fumipennis* WALK.
3. *Eutermes hastilis* FROGG.
4. *Eutermes magnus* FROGG.
5. *Eutermes pyriformis* FROGG.
6. *Eutermes triodiæ* FROGG.



Photo E. Mjöberg.

Text Fig. 59. Vertical section through nest of *Eutermes kimberleyensis* MJÖB. n. sp. (from the collections of the Swedish State Museum.

7. *Eutermes tumuli* FROGG.
8. *Eutermes kimberleyensis* MJÖB.
9. *Eutermes yarrabahensis* MJÖB.
10. *Eutermes nigerrimus* MJÖB.
11. *Eutermes Tyriei* MJÖB.
12. *Hamitermes perniger* FROGG.
13. *Hamitermes rubriceps* FROGG.

14. *Hamitermes meridionalis* FROGG.
15. *Hamitermes laurensis* MJÖB.
16. *Hamitermes scopulus* MJÖB.
17. *Mirotermes Cheeli* MJÖB.
18. *Microcerotermes Turneri* FROGG.
19. *Microcerotermes excisus* MJÖB.



Photo E. Mjöberg.

Text Fig. 60. Nests of *Eutermes kimberleyensis* MJÖB. n. sp. (from the collections of the Swedish State Museum).

Of some of these 19 nest-building species our knowledge is, however, very fragmentary; this is above all the case with the interesting species *Hamitermes rubriceps* FROGG. («nest at the roots of a tussock of spinifex grass»). Also the nests of many of the *Eutermes*-species are described in a very inadequate way. Thence an attempt of tabulating them is very difficult. In the sequel, however, I have tried to draw up a preliminary key to the hitherto known 10 nests constructed by *Eutermes*-species. When no other constant characters have been available I have had to use

different dimensions and proportions, being quite aware of the difficulties of separating the half-grown or still younger nests on that system.

The nests of the 10 hitherto Eutermes species known to be nest builders may be tabulated as follows.

- I. Nest black, rounded, of brittle material, built on logs or in trees.
(Text Fig. 58 a, 62.) *E. fumipennis* WALK.
- II. Nest not black, not rounded, of harder material, never arboreal.
- A. Nest broader in diameter at the base than high.
- a. Nest very small, only up to 30 cm in diameter at the base.
E. hastilis FROGG.
- b. Nest very much larger, about one meter in diameter at the base and nearly as high.
E. Tyriei MJÖB.
(Plate 3, Fig. 1.)
- B. Nest not broader in diameter at the base than high.
- a. Nest of moderate size, not growing higher than about one meter.
- *. Nest up to a height of one meter.
E. magnus FROGG.
- ** . Nest up to about 50 cm high.
E. yarrabahensis MJÖB.
- ***. Nest less than 50 cm high. *E. tumuli* FROGG.
- b. Nest of considerably larger size.
- *. Nest very broad, up to two meters in diameter, often mushroom-shaped.
(Text Fig. 13.) *E. nigerrimus* MJÖB.
- ** . Nest not so broad, not more than about one meter or less in diameter, more slender, never mushroom-shaped.
- †. Nest very large up to 6 meters height, columnar in form, a little more than one meter in diameter at the base, swelling out a few feet above, running up with a uniform width to the irregular, pointed summit, and the sides ribbed with projecting buttresses.
E. pyriiformis FROGG.
- (See FROGGATT, White ants, Dprtm. agr. sc. N. S. W. 1905, p. 38, 39.)
- ††. Nest up to four meters height, rounded at the base, of a uniform diameter, but contracted at the summit into a rounded dome. *E. triodiæ* FROGG.
(See FROGGATT, l. c., p. 10.)
- †††. Nest up to two meters height, not rounded at the base.
E. kimberleyensis MJÖB.
(See Text Fig. 60.)

The only two arboreal nests I have met with in Australia are built by *Eutermes fumipennis* WALK. and by *Hamitermes Cheeli* MJÖB. which latter species, however, also builds typical black, conical ground-nests of a form and shape very much resembling the nest of *Microcerotermes excisus* MJÖB. In the Cape York Peninsula I observed that many smaller trees in the open savannah forest were covered at the eastern side with, more or less broad, reddish ducts, which sometimes were so wide as to cover the whole eastern half of the tree. In the galleries underneath there were thousands of workers and soldiers of *Rhinotermes intermedius* running up and down. No sign of any nest-like formation could, however, be discovered. Apparently the galleries were built up under the fairly brittle cover in order to protect the workers in their harvesting of useful products from the higher parts of the tree. The real nest of the two Australian *Rhinotermes* species is always built under the ground or under stones, logs etc.

The reason, why the two above-mentioned species build arboreal nests is very likely in order to escape floods. In many localities the ground is very swampy and gets quite flooded after an exceptionally heavy rainfall. This would certainly prove very disastrous for the nest, which in both species is of a very light and brittle construction. To secure the young offspring and the valuable queen, or queens, the nests have been placed higher and higher up on the trunk. *Mirotermes Cheeli* MJÖB. builds its nest so far as I have observed only about one meter above the ground, *Eutermes fumipennis* WALK. at a height of even 40 metres.

One of the most interesting fields for studying the termite life and especially the different nests in Australia is the northern part of Queensland. In many places in the interior parts of Cape York Peninsula the ground is literally covered with nests of the most variable types. In the vicinity of Laura I could count in less than five minutes up to six different nests. These were the following: (1) the very tall greyish »magnetic» nests of *Hamitermes meridionalis* FROGG. standing as close to each other as the tombstones on a graveyard (Plate 6, Fig. 2), (2) the very broad conical, heavy nests of *Eutermes Tyriei* MJÖB. (Pl. 3, Fig. 1), (3) the flat, cake-like, solid nests of *Hamitermes perniger* FROGG., lying on

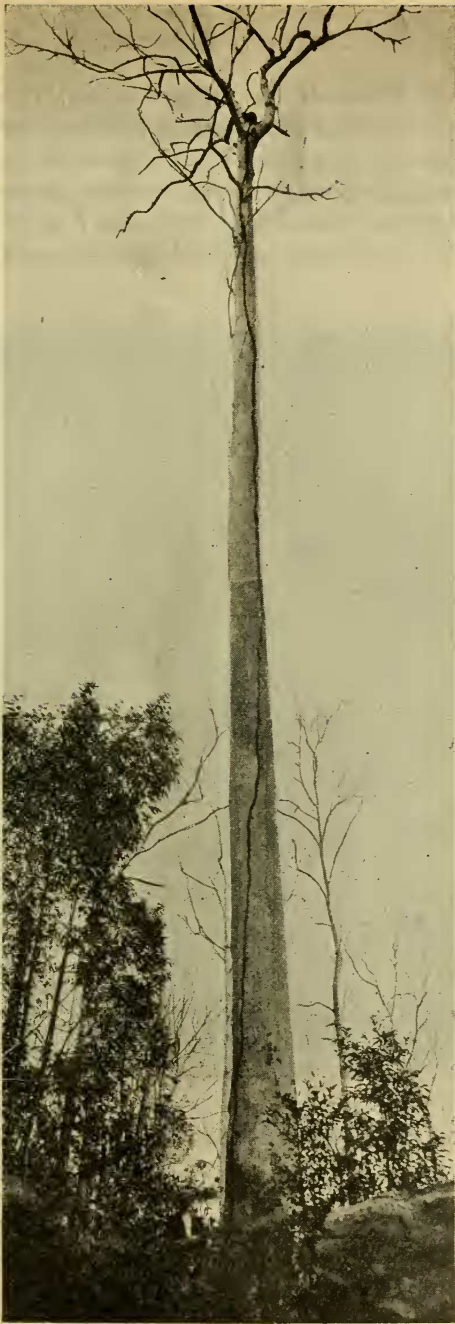


Photo E. Mjöberg.

Text Fig. 61. Arboreal nest of *Eutermes fumipennis* WALK. The black nest is seen at the top and the dark galleris leading up to it on the trunk. The tree is a dead ring-barked *Eucalyptus*-tree of about 45 meters in height. Mapleton, Southern Queensland.

the ground level (Plate 4, Fig. 1), (4) the very typical, sharply pointed greyish nests of *Hamitermes scopulus* MJÖB. standing here and there on the ground, like small steeples (Textfig. 63), (5), the small, conical, whitish-yellowish nests of *Hamitermes laurensis* MJÖB. (Text Fig. 64), and finally (6) the dark brittle rounded or conical nest of *Mirotermes Cheeli* MJÖB. (Pl. 5, fig. 2).



Photo E. Mjöberg.

Text Fig. 62. Nest of *Hamitermes scopulus* MJÖB. fr. Laura, N. Queensland.

There has been much discussion about the so called »magnetic nest», always facing east and west with the broader sides, and built like a wall with one side convex, the other one concave. According to JACK, their shape and form is an adaptation in order to secure the maximum of desiccation, the repairs being made only during the wet season. My opinion is that the peculiar shape and form of the nest is best

explained as an adaptation to the climate. The nest being built of a more brittle material than other ground nests (which as a rule have a thick cover or cemented clay and sand) certainly runs a great risk of being blown down, as even with its present shape not seldom seems to happen when the violent northern storms blow. Its narrow flattened



Photo E. Mjöberg.

Text Fig. 63. Nest of *Eutermes fumipennis* WALK. from N. S. W.

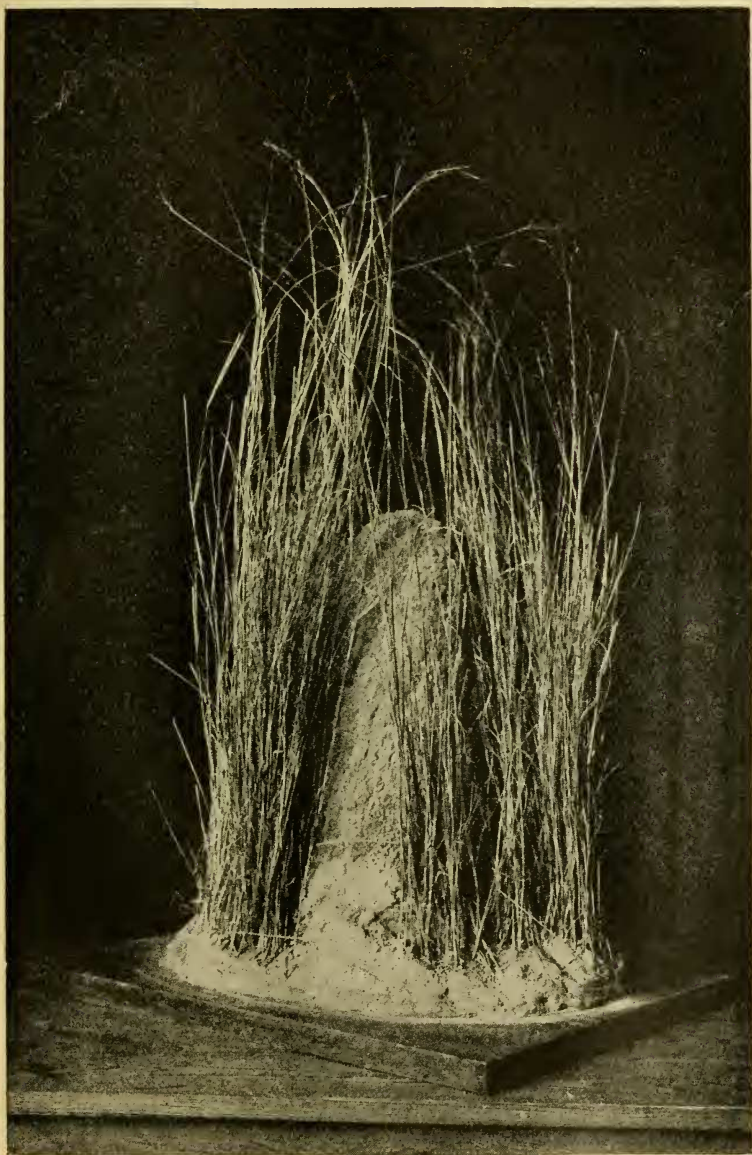
shape is very likely an adaptation against the very hot sun. A nest of this shape apparently does not absorb so much heat as do the more conical or flattened ground-nests. These latter are so hot in the middle of the day that one burns one's hand when one touches the outer wall. The interior parts are so hot that the termites themselves cannot stand the immense heat, but all disappear from the parts of the nest

situated above the ground-level, to stay in the cooler subterranean parts during the hottest hours of the day. This is the case with the termites of the nests of *Eutermes Tyriei* MJÖB., *Hamitermes laurensis* MJÖB. and *Hamitermes scopulus* MJÖB. In most nests not one single termite can be found in the upper parts from about 9 a. m. to about 4 p. m. Later in the day and during the cooler night-hours the nests are crowded with soldiers and workers. This is a fact I have been able to prove by opening at least a couple of hundred nests during the day at various hours. Later in the evening, when the sun has already set and the temperature sinks considerably the termites go down again into the underground parts, where higher temperature prevails in consequence of the immense heat having been absorbed during the hot hours of the day by the soil, which retains the heat better than the harder upper parts of the nest.

During my caravan expedition through Cape York Peninsula from Laura to Coleman River (Aug.—Okt.) I observed the termites in the small nests of *Hamitermes laurensis* MJÖB. As soon as the sun showed the first signs of rising, we made a start. Every morning between 4—5 a. m. I cut off the small nest with an axe, this making a cross-section only some centimeters above the ground. The few termites which were to be found in the nests were all congregated, slowly crawling in one mass, at the eastern wall, apparently trying to warm themselves at the first rays of the sun. Not a single termite could be discovered in the western parts of the nest. Apparently the termites are very sensitive to temperature changes.

In the narrow flattened nests of *Hamitermes meridionalis* FROGG, the interior parts are not so hot as in the conical or flattened nests. We also find that not a few termites move about in the lower and median parts of these nests. For these reasons I have come to the conclusion, that the flattened form of the »magnetic» nests is an adaptation to the hot sun, their peculiar way of facing the rising and setting sun an adaptation to the strong north wind prevailing during certain seasons.

In the nests of *Hamitermes meridionalis* FROGG., *Hamitermes laurensis* MJÖB. and *Eutermes Tyriei* MJÖB. I made the very interesting discovery that certain parts of the nests



Text Fig. 64. Nest of *Hamitermes laurensis* MjÖB. from Cape York Peninsula
(from the collections of the Swedish State Museum).

are set apart as grave-fields or cemeteries. In every nest of these three species the galleries situated at the very top of the nest wereal ways filled up with dead, dried termites. I have hunted through hundreds and hundreds of nests without finding any dead ones in other parts.

The reasons for this arrangement are easily understood. In a nest so thickly »populated» and with so short a lifetime for the inhabitants, cases of death must occur very frequently. It is of utmost importance to keep up the very best sanatory conditions in order to prevent or check diseases. The termites in question have apparently found out that the very best way of desinfecting the corpses is to expose them to the very hot sun in the upper galleries, i. e. the hottest parts of the nest, where they dry up very quickly.

Below the top galleries there are other galleries which are filled with a powdered material consisting chiefly of the chewed and cut parts of the dead, dried termites. Why they are stored up here I cannot say, but it seems to be most likely that this chewed or finely cut material is used as food for the young ones, which are to be found very plentifully in the various parts of the nest. Further observations are badly needed to ascertain the more intimate habits of the three species here mentioned.

In the grave-fields I have found some few inquilines, among them a little wingless Psocid with strongly incrassated hind femora, a small member of the group *Collembola* and further a little suite, which will be duly described in a coming paper.

Order Isoptera.

List of the Australian genera and species of termites described up to year 1919, together with a list of their distribution and the hitherto known (×) different stages and nests.¹

	Patria	Imago	Soldier	Worker	Nest
I Family <i>Mastotermitidæ</i> SILV.					
1. <i>Mastotermes darwiniensis</i> FROGG.	N. Australia	×	×	×	×
II. Family <i>Protermitidæ</i> HOLMGR.					
2. <i>Stolotermes brunneicornis</i> HAG.	Tasmania	×	—	—	—
3. <i>Stolotermes ruficeps</i> BRAUER.	New Zealand	×	×	—	—
4. <i>Stolotermes queenslandicus</i> MJÖB n. sp.	Queensland	×	×	×	×
5. <i>Stolotermes australicus</i> MJÖB. n. sp.	"		×	×	×
6. <i>Porotermes Adamsoni</i> FROGG.	N. S. Wales	×	×	×	×
7. <i>Porotermes Froggatti</i> HOLMGR.	Tasmania		×	×	—
8. <i>Porotermes grandis</i> HOLMGR.	Victoria	—	×	—	—
9. <i>Calotermes insularis</i> WHITE	"	×	—	—	—
10. <i>Calotermes irregularis</i> FROGG.	Queensland	×	×	×	—
11. <i>Calotermes robustus</i> FROGG.	N. S. Wales	×	—	—	—
12. <i>Calotermes longiceps</i> FROGG.	"	×	×	—	×
13. <i>Calotermes Brauni</i> FROGG.	New Zealand	×	×	×	×
14. <i>Calotermes tuberculatus</i> FROGG.	N. S. Wales	×	×	×	(×)
15. <i>Calotermes iridipennis</i> FROGG.	Victoria	×	—	—	—
16. <i>Calotermes brevicornis</i> FROGG.	Queensland	×	×	×	—
17. <i>Calotermes eucalypti</i> FROGG.	N. S. Wales	×	×	×	×
18. <i>Calotermes malandensis</i> MJÖB. n. sp.	Queensland	×	×	×	×
19. <i>Calotermes paralleliceps</i> MJÖB. n. sp.	"	—	×	×	×
20. <i>Calotermes oculifer</i> MJÖB. n. sp.	"	—	×	×	×
21. <i>Calotermes affinis</i> MJÖB. n. sp.	"	×	×	×	×
22. <i>Calotermes trilineatus</i> MJÖB. n. sp.	"	(×)	×	—	×
23. <i>Calotermes dubius</i> MJÖB. n. sp.	"	(×)	×	—	×

¹ The old species not completely enough described to be identified are left out in this list.

	Patria	Imago	Soldier	Worker	Nest
III. Family <i>Mesotermitidæ</i> HOLMGR.					
24. <i>Leucotermes ferox</i> FROGG.	Australia	×	×	×	×
25. <i>Leucotermes platycephalus</i> FROGG. .	S. Australia	×	—	—	—
26. <i>Coptotermes acinaciformis</i> FROGG. .	N. W. Australia	×	×	×	×
27. <i>Coptotermes australis</i> WALK.	Australia	×	—	—	—
28. <i>Coptotermes lacteus</i> FROGG.	»	×	×	×	×
29. <i>Coptotermes Michaelsoni</i> SILV.	W. Australia	×	×	×	×
30. <i>Rhinotermes intermedius</i> BR.	Australia	×	×	×	×
31. <i>Rhinotermes queenstandicus</i> FROGG.	W. S. Australia	×	×	×	×
32. <i>Parrhinotermes australicus</i> MJÖB. n. sp.	Queensland	—	×	×	(X)
IV. Family <i>Metatermitidæ</i> HOLMGR.					
33. <i>Eutermes fumigatus</i> BRAUER.	S. Australia	×	×	×	×
34. <i>Eutermes fumipennis</i> WALK.	Extratropical Australia	×	×	×	×
35. <i>Eutermes hastilis</i> FROGG.	Queensland	×	×	×	×
36. <i>Eutermes magnus</i> FROGG.	N. Australia	×	×	×	×
37. <i>Eutermes pyriformis</i> FROGG.	»	(X)	×	×	×
38. <i>Eutermes triodiæ</i> FROGG.	»	×	×	×	×
39. <i>Eutermes tumuli</i> FROGG.	W. Australia	×	×	×	×
40. <i>Eutermes apiocephalus</i> SILV.	»	(X)	×	×	(X)
41. <i>Eutermes occasus</i> SILV.	»	×	×	×	—
42. <i>Eutermes pluviialis</i> MJÖB. n. sp. . .	Queensland	×	×	×	×
43. <i>Eutermes kimberleyensis</i> MJÖB. n. sp.	N. W. Australia	—	×	×	×
44. <i>Eutermes coalescens</i> MJÖB. n. sp. . .	W. Australia	—	×	×	(X)
45. <i>Eutermes yarrabahensis</i> MJÖB. n. sp.	W. Queensland	—	×	×	×
46. <i>Eutermes eucalypti</i> MJÖB. n. sp. . .	N. W. Australia	—	×	×	(X)
47. <i>Eutermes Aagaardi</i> MJÖB. n. sp. . .	S. W. Australia	—	×	×	(X)
48. <i>Eutermes Pulleinci</i> MJÖB. n. sp. . .	N. Queensland	—	×	×	(X)
49. <i>Eutermes nigerrimus</i> MJÖB. n. sp. .	N. Australia	×	×	×	×
50. <i>Eutermes Tyriei</i> MJÖB. n. sp. . . .	N. Queensland	—	×	×	×
51. <i>Eutermes ocellaris</i> MJÖB. n. sp. . .	N. W. Australia	×	—	—	—
52. <i>Eutermes magnificus</i> MJÖB. n. sp. .	»	×	—	—	—
53. <i>Hamitermis perniger</i> FROGG.	W. C. N. Australia	—	×	×	×
54. <i>Hamitermes rubriceps</i> FROGG.	C. Australia	×	×	×	(X)
55. <i>Hamitermes meridionalis</i> FROGG. . .	E. Australia	—	×	×	×
56. <i>Hamitermes obeuntis</i> SILV.	W. Australia	(X)	×	×	—

	Patria	Imago	Soldier	Worker	Nest
57. <i>Hamitermes Hartmeyer</i> SILV. . . .	W. Australia	—	×	×	—
58. <i>Hamitermes perornatus</i> SILV. . . .	»	—	×	—	—
59. <i>Hamitermes heterognathus</i> SILV. . .	»	—	×	—	—
60. <i>Hamitermes laurensis</i> MJÖB. n. sp. .	N. Queensland	—	×	×	×
61. <i>Hamitermes kimberleyensis</i> MJÖB. n. sp.	N.W. Australia	×	×	×	(X)
62. <i>Hamitermes herbertensis</i> MJÖB. n. sp.	N. Queensland	×	×	×	(X)
63. <i>Hamitermes scopulus</i> MJÖB. n. sp. .	»	—	×	×	×
64. <i>Hamitermes obtusidens</i> MJÖB. . . .	S. Queensland	×	×	×	(X)
65. <i>Hamitermes lativentris</i> MJÖB. n. sp.	»	×	×	×	(X)
66. <i>Hamitermes latidens</i> MJÖB. n. sp. .	N. Queensland	—	×	×	(X)
67. <i>Ahamitermes edentatus</i> MJÖB. n. g. n. sp.	»	—	×	—	(X)
68. <i>Mirotermes Kræpelini</i> SILV.	W. Australia	—	×	×	—
69. <i>Mirotermes krisiformis</i> FROGG. . . .	N. S. Wales	—	×	×	×
70. <i>Mirotermes Harris</i> MJÖB. n. sp. . .	N. Queensland	×	×	×	(X)
71. <i>Mirotermes Maiden</i> MJÖB. n. sp. . .	»	—	×	—	(X)
72. <i>Mirotermes broomensis</i> MJÖB. n. sp.	N.W. Australia	—	×	×	(X)
73. <i>Mirotermes Cheeli</i> MJÖB. n. sp. . .	N. Queensland	—	×	×	×
74. <i>Mirotermes Allen</i> MJÖB. n. sp. . . .	»	—	×	×	(X)
75. <i>Mirotermes alicensis</i> MJÖB. n. sp. .	»	—	×	×	(X)
76. <i>Microcerotermes distinctus</i> SILV. . .	N.W. S.W. Australia		×	×	×
77. <i>Microcerotermes serratus</i> FROGG. . .	N. Australia	—	×	×	—
78. <i>Microcerotermes Turner</i> FROGG. . .	Queensland	×	×	×	×
79. <i>Microcerotermes parviceps</i> MJÖB. n. sp.	S. Queensland	×	×	×	×
80. <i>Microcerotermes excisus</i> MJÖB. n. sp.	»	×	×	×	×

**List of the new species of Australian termites described
in this paper.**

	Page
1. <i>Stolotermes queenslandicus</i> MJÖB. n. sp.	6
2. <i>Stolotermes australicus</i> MJÖB. n. sp.	9
3. <i>Calotermes malandensis</i> MJÖB. n. sp.	12
4. <i>Calotermes paralleliceps</i> MJÖB. n. sp.	16
5. <i>Calotermes oculifer</i> MJÖB. n. sp.	19
6. <i>Calotermes affinis</i> MJÖB. n. sp.	21
7. <i>Calotermes trilineatus</i> MJÖB. n. sp.	24
8. <i>Calotermes dubius</i> MJÖB. n. sp.	26
9. <i>Parrhinotermes queenslandicus</i> MJÖB. n. sp.	31
10. <i>Eutermes nigerrimus</i> MJÖB. n. sp.	38
11. <i>Eutermes pluvialis</i> MJÖB. n. sp.	45
12. <i>Eutermes kimberleyensis</i> MJÖB. n. sp.	49
13. <i>Eutermes coalescens</i> MJÖB. n. sp.	51
14. <i>Eutermes yarrabahensis</i> MJÖB. n. sp.	53
15. <i>Eutermes eucalypti</i> MJÖB. n. sp.	54
16. <i>Eutermes Aagaardi</i> MJÖB. n. sp.	55
17. <i>Eutermes Pulleinei</i> MJÖB. n. sp.	57
18. <i>Eutermes Tyriei</i> MJÖB. n. sp.	59
19. <i>Eutermes ocellaris</i> MJÖB. n. sp.	61
20. <i>Eutermes magnificus</i> MJÖB. n. sp.	63
21. <i>Hamitermes laurensis</i> MJÖB. n. sp.	74
22. <i>Hamitermes kimberleyensis</i> MJÖB. n. sp.	75
23. <i>Hamitermes herbertensis</i> MJÖB. n. sp.	78
24. <i>Hamitermes scopulus</i> MJÖB. n. sp.	81
25. <i>Hamitermes obtusidens</i> MJÖB. n. sp.	83
26. <i>Hamitermes lativentris</i> MJÖB. n. sp.	86
27. <i>Hamitermes latidens</i> MJÖB. n. sp.	88
28. <i>Ahamitermes nidicola</i> MJÖB. n. g., n. sp.	89
29. <i>Mirotermes Harrisii</i> MJÖB. n. sp.	92
30. <i>Mirotermes Maidenii</i> MJÖB. n. sp.	94
31. <i>Mirotermes Cheeli</i> MJÖB. n. sp.	95
32. <i>Mirotermes Allenii</i> MJÖB. n. sp.	98
33. <i>Mirotermes broomensis</i> MJÖB. n. sp.	99
34. <i>Mirotermes alicensis</i> MJÖB. n. sp.	100
35. <i>Microcerotermes parviceps</i> MJÖB. n. sp.	103
36. <i>Microcerotermes excisus</i> MJÖB. n. sp.	105

Explanation of Plates 1—6.

PLATE 1.

- Fig. 1. *Hamitermes (Drepanotermes) perniger* FROGG. Imago.
 » 2. *Stolotermes queenslandicus* n. sp. Imago.
 » 3. *Calotermes oculifer* n. sp. Head and thorax of soldier.
 » 4. » *malandensis* n. sp. D:o.
 » 5. » *paralleliceps* n. sp. D:o.
 » 6. *Stolotermes queenslandicus* n. sp. D:o.
 » 7. *Calotermes (Glyptotermes) affinis* n. sp. D:o,
 » 8. *Stolotermes australicus* n. sp. D:o.

PLATE 2.

- Fig. 1. *Mirotermes Maidenii* n. sp. Head and prothorax of soldier.
 » 2. » *Harrisi* n. sp. D:o.
 » 3. » *broomensis* n. sp. D:o.
 » 4. » *Cheeli* n. sp. D:o.
 » 5. *Eutermes kimberleyensis* n. sp. D:o.
 » 6. » *fumipennis* WALK. D:o.
 » 7. *Calotermes (Glyptotermes) affinis* n. sp. Imago.
 » 8. *Eutermes apiocephalus* SILV. Head and prothorax of soldier.
 » 9. *Mirotermes Harrisi* n. sp. Forewing of imago.
 » 10. *Eutermes (Trinervitermes) Palleinei* n. sp. Head and prothorax of
 a larger soldier.

PLATE 3.

- Fig. 1. Nest of *Eutermes Tyriei* n. sp., from Laura, N. Queensland.
 » 2. Nest of *Coptotermes lacteus* FROGG., from Alice River, N. Queensland.

PLATE 4.

- Fig. 1. Nest of *Hamitermes (Drepanotermes) perniger* FROGG., from Broome,
 N. W. Queensland.
 » 2. Nest of *Eutermes nigerrimus* n. sp., from Alice River, N. Queensland.

PLATE 5.

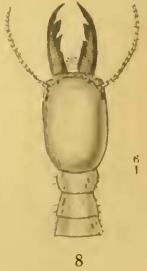
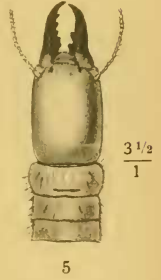
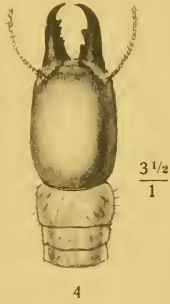
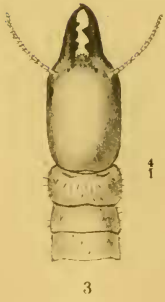
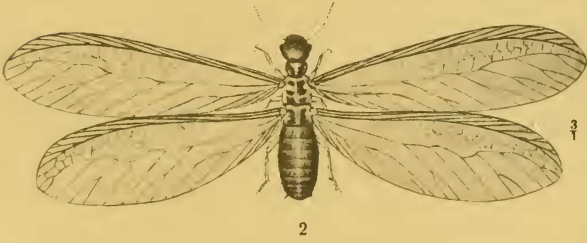
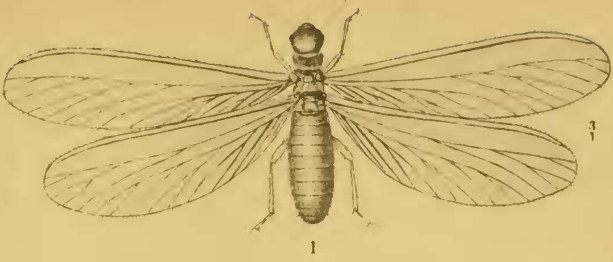
- Fig. 1. Galleries of *Mastotermes darwiniensis* FROGG. in a trunk of *Gyrocarpus Jacquinii* from Kimberley, N. W. Australia.
 » 2. Nest of *Mirotermes Cheeli* n. sp., from Laura, Queensland.

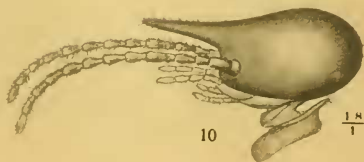
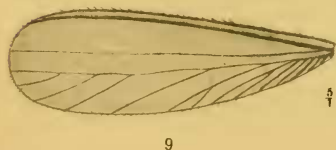
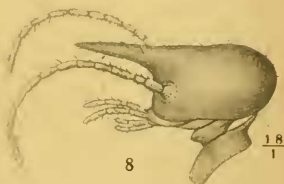
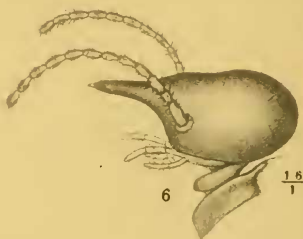
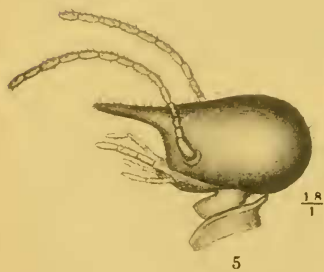
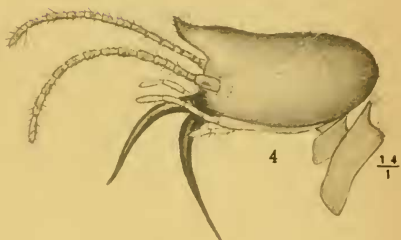
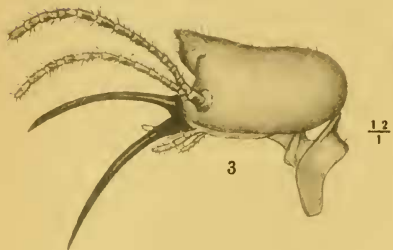
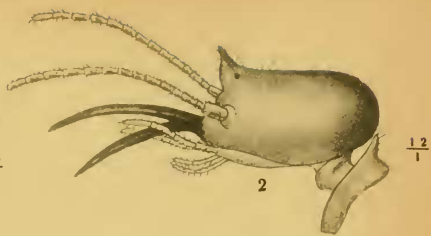
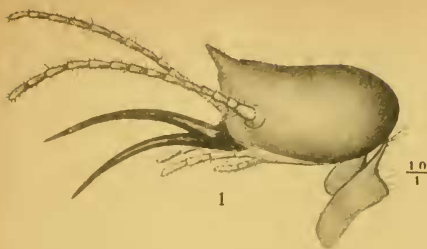
PLATE 6.

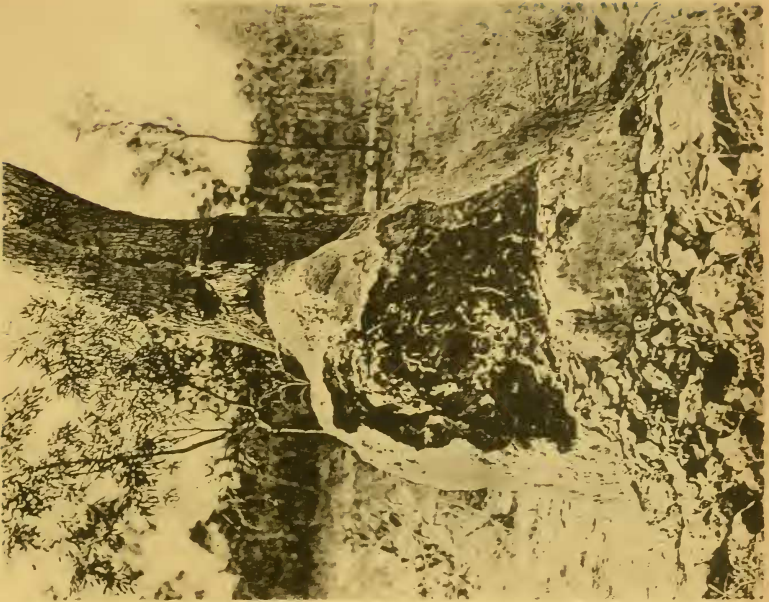
- Fig. 1. Nest of *Microcerotermes excisus* n. sp., from Glen Lamington, S. Queensland.
- » 2. Nest of *Hamitermes meridionalis* FROGG., from Laura, N. Queensland.



Tryckt den 21 maj 1920.



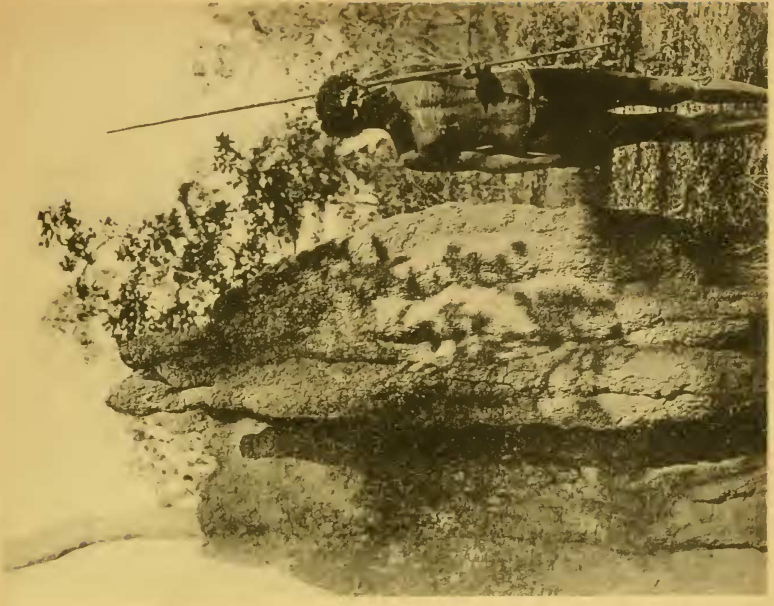




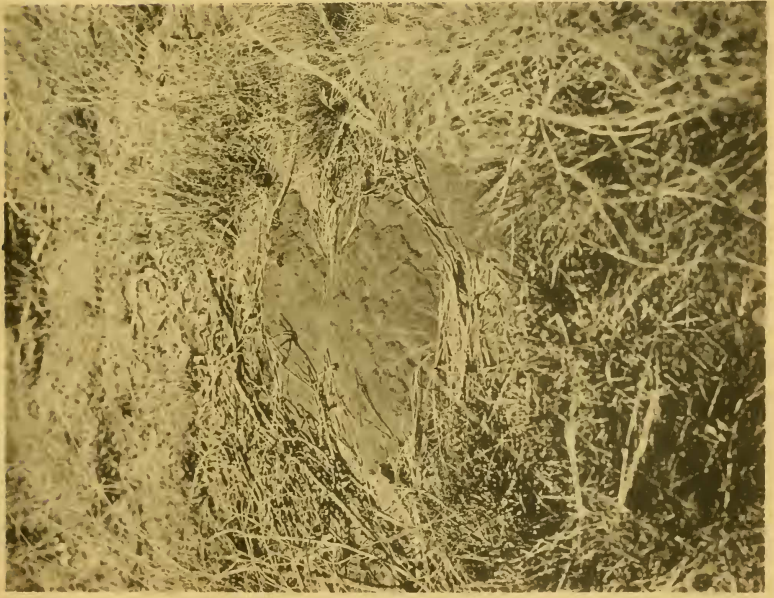
2



1

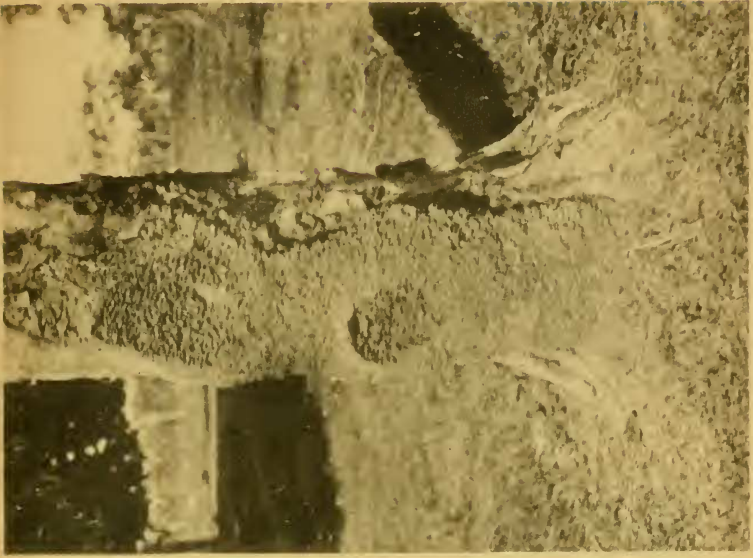


2



1

Chilquerista Graf. A. - B. Sthlm



2



1

Cederquists Graf. A. N., Sthlm



1



2